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# URBAN INDICATORS

## Quality of Life Comparisons for Canadian Cities

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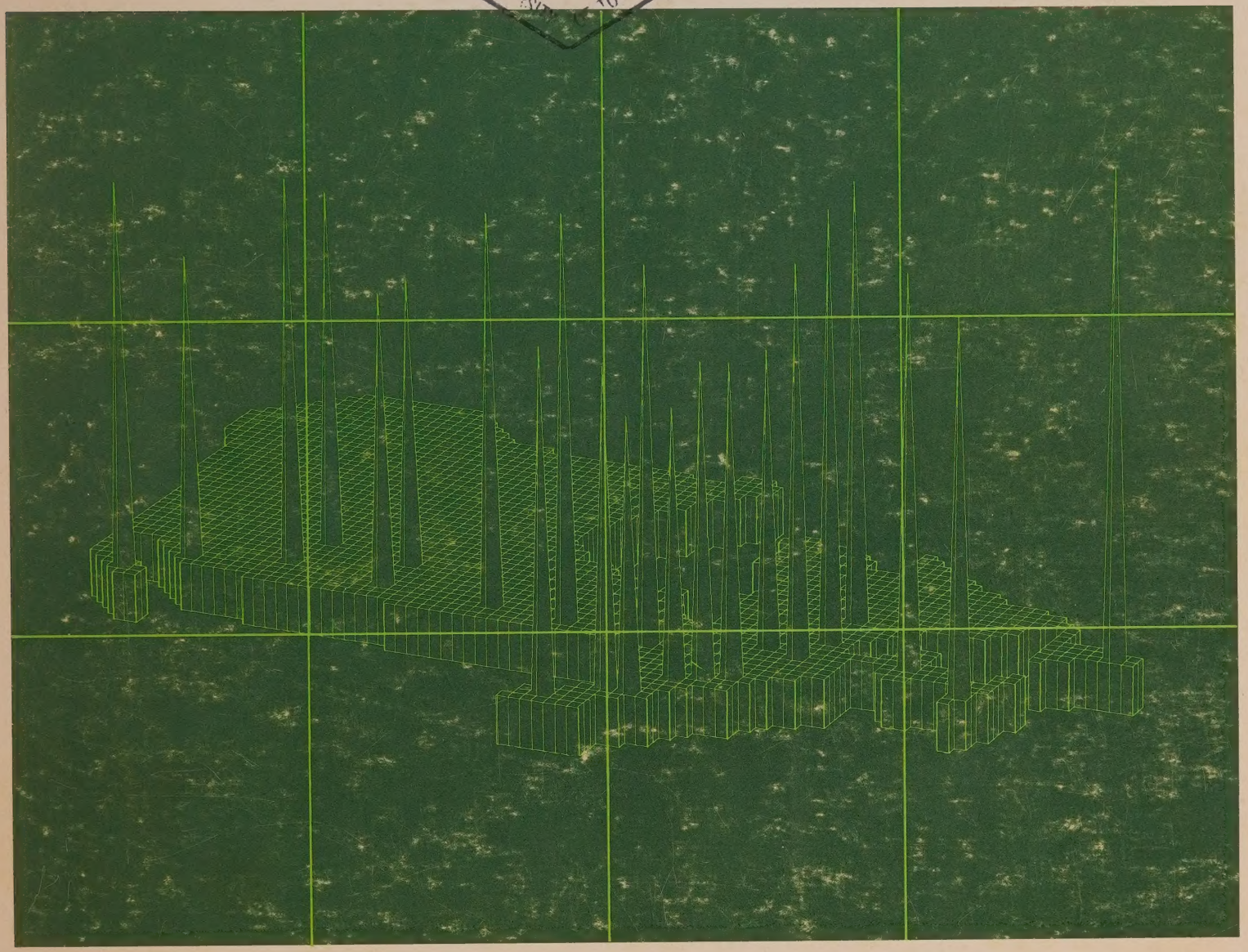

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Quality of Life Comparisons for
Canadian Cities

CA1 UA
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## Quality of Life Comparisons for Canadian Cities

John N. Stewart
(Project Leader)

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Huguette Turcotte

Urban Economy/Environment Directorate

Ministry of State
for Urban Affairs,
December 1975

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Published under the authority of
The Honourable Barney Danson
P.C., M.P.
Minister of State
for Urban Affairs

ISBN 0-660-00372-4

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The computer visuals in this publication are a representative sample of how the computer can be used to present information visually. In addition to their esthetic value, such visual representations have many practical advantages such as: fast assimilation of overall range, variation and clustering of data; rapid comprehension of the meaning of the ideas behind the data represented; compact presentation of data and therefore greater likelihood of being read.

Since it is expected that computer graphics will come into more general usage in the future, the Ministry of State for Urban Affairs has already acquired the necessary equipment and the programs required to drive this equipment.

It is a matter of the Ministry applying its growing expertise in computer graphics.

# PREFACE

One reason why Canadians have been deprived of information on the quality of various aspects of their lives is that experts cannot agree on how that quality should be measured. The result is that many attempts to develop quality-of-life indicators have been defeated by arguments that the suggested indicators are imperfect. Everyone, it seems, is an expert in proving why a particular indicator is misleading or outright bad.

The Ministry of State for Urban Affairs is well aware of the limitations of quality-of-life indicators and the usual arguments against their use. However, these arguments may serve as warnings to the reader as to how the indicators should be assessed.

The first argument is that it is impossible to establish the importance of a particular indicator relative to others. Is a change in the automobile accident rate a more important indicator than a change in the air pollution rate? Frankly, we do not know, so we do not even try to add up the indicators to give an overall quality-of-life figure. Assess them individually and view what you will with alarm or satisfaction.

The second argument is that the initial reporting of many of the facts entering into statistics is suspect. Some jurisdictions may be meticulous in recording and reporting information, other jurisdictions may be careless or

even deliberately under-report events which cast them in an unfavourable light. When this is the case for a particular indicator, then the figures should be brought out into the open so that those who have an interest in them can pursue the question of accuracy.

The third argument is that an indicator can itself be ambiguous. The divorce rate, for instance, can be seen either as a positive indicator, freeing people from unhappy marriages, or as a negative indicator, showing the breakdown of the family. Take your pick.

A fourth argument is that the level of a condition in a given year is not as important as whether that level is an improvement or deterioration over previous years. A crime rate of 500 per 10,000 of population would be viewed as favourable by a city whose crime rate in the previous year was 1,000; it would be viewed as disastrous by a city whose previous year's rate was 300. We hope soon to be able to provide data on changes over time, but before we do so we would like to gauge the reaction to the indicators we have used here.

There are other peculiar things about indicators. For example, take the indicator "Number of Criminal Code Offenses Per 10,000 Population". A low figure can mean (a) that the crime rate is actually low, or (b) that residents have so little confidence in their police force that they do not bother reporting minor crime, or (c) that what one community reports diligently, such as soliciting by prostitutes, another community does not see as a crime worth reporting, or (d) that the police do not bother recording all the crimes reported. Further, the indicator does not reflect the gravity of the crimes reported; the Criminal Code covers a wide range of sins and all are given equal weight in the indicator. (Those who are interested in finer breakdowns than have been used here can find the information in Statistics Canada publications.) All of this provides an example of how easy it is to discredit an indicator. As we said previously, everyone is an expert in proving why a particular indicator is suspect. In view of all of these reservations, one might wonder why MSUA is publishing these indicators for the 22 principal metropolitan areas of Canada.

First, we believe that a large number of Canadians living in cities are curious about the way their community stacks up against others. We want to satisfy that curiosity. Further, we believe that a reaction to the indicators is highly desirable, whatever form it takes. If someone proves that these statistics are inaccurate, that may show the way to improving their accuracy. If a municipality is dismayed at finding itself unfavourably compared with others, it might take measures to improve conditions. If someone comes up with a more accurate indicator of a particular condition, we would welcome having it brought to our attention.

In brief, if we are to disseminate information about urban life, we have to make a start. That start has now been made.

H.L. Laframboise
Assistant Secretary
Policy and Research

R.W. Crowley
Director
Urban Economy and Environment Directorate

# INTRODUCTION

The aim of this study is straightforward: to provide comparative measures of some aspects of the quality of life in Canadian cities. In doing this, we hope to stimulate discussion about the potential of certain indicators for identifying urban problems and their usefulness for policy development and monitoring.

We do not pretend that the set of indicators we have used is comprehensive. This project is a first foray, so to speak, and we hope it serves as a catalyst for other work.

Thirty-two indicators are presented here, in the categories of social, economic and physical development. Urban areas are ranked from "best" to "worst" for each indicator. The same data are then plotted geographically from west to east, giving some indication of regional variations. Following the presentation of data for each indicator, there is a brief discussion concerning what it measures, the shortcomings of the indicator as judged against a set of selection criteria and suggestions for developing new indicators.

Before proceeding to the indicators themselves, we briefly examine the assumptions underlying the indicator concept and some possible uses for indicators. We also provide details concerning the selection criteria for particular indicators and general problems encountered in rigidly applying these criteria. The possibilities for future Ministry activity in this area are also elaborated. Some readers may prefer to go directly to the indicators and return later to the description of underlying assumptions. A technical appendix concludes the report.

The results of the study are analysed to see if the set of thirty-two indicators can be reduced to a smaller number, to test whether or not summary variables exist, and to show how the data might be more rigorously interpreted.

Since this is our first effort in this area, we would welcome comment addressed to Director, Urban Economy and Environment Directorate, Ministry of State for Urban Affairs, Ottawa, K1A 0P6.

John N. Stewart (Project Leader)
David Belgue
Wayne Bond
Odette L'Anglais
Huguette Turcotte
Urban Economy/Environment Directorate

# LIST OF INDICATORS

## I. URBAN INDICATORS: SOCIAL DEVELOPMENT

1. Number of Juveniles Charged with Criminal Code Offenses per 10,000 Population for 22 Major Urban Areas, 1971.

2. Number of Criminal Code Offenses per 10,000 Population for 22 Major Urban Areas, 1971.

3. Percent of Offenses Cleared for 22 Major Urban Areas, 1971.

4. Number of Missing Persons per 10,000 Population for 22 Major Urban Areas, 1971.

5. Illegitimate Births per 1,000 Births, for 22 CMAs, 1973.

6. Educational Achievement: Percentage of Population Aged 20-34, Not Presently in School, with Grade 10 Education or Less, for 22 CMAs, 1971.

7. Public Cultural Opportunities: Amount of Indoor Space in Exhibition Halls, Museums and Art Galleries per 100 Population, for 22 CMAs, 1971.

8. Public Library Usage: Annual Per Capita Book Loans for 22 CMAs, 1971.

9. Social Opportunities: Amount of Floor Space in Commercial Meeting Establishments per 100 Population for 19 CMAs, 1971.

10. Cultural Homogeneity: Percent Living in Province of Birth for 22 CMAs, 1971.

11. Index for Ethnic Prominence for Non-English and Non-French Ethnic Groups for 22 CMAs, 1971.

12. Number of Major Ethnic Groups of Non-Founding Nations for 22 CMAs, 1971.

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16. Voter Turnout for Municipal Elections for 22 Major Canadian Cities, since 1969.

## II. URBAN INDICATORS: ECONOMIC DEVELOPMENT

17. Average (Mean) Income After Federal Tax for Tax Filers for 22 Major Metropolitan Areas, 1972.

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19. Occupational Status Index for 22 CMAs, 1971.

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21. Unemployment Rates Among Active Labour Force Participants, for 22 CMAs, 1971.

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III. URBAN INDICATORS: PHYSICAL DEVELOPMENT

23. Average (Mean) Estimated Total Costs for New Single-Detached Dwellings Financed Under NHA, for 22 CMAs, 4th Quarter 1974.

24. Occupancy Status: Percent of Dwellings Owner-Occupied, 22 CMAs, 1974.

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28. Percentage of Children Living in Apartment Units for 22 CMAs, 1971.

29. Public Transportation Ridership: Fare Passengers Carried Per Capita for 20 CMAs, 1972.

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31. Air Quality: Sulphur Dioxide Concentration for 17 CMAs, 1973.

32. Fire and Automobile Hazard Index, Adjusted for Thousand Population for 22 Major Urban Areas, 1971.

## WHAT IS AN URBAN INDICATOR?

An indicator points out something of interest about an object or process. An urban indicator, consequently, focuses on urban objects or urban processes. Since there are as many points of interest in urban life as there are concerned individuals, the selection of any one indicator inherently involves value judgements. For our purposes, an indicator measures quantitatively a key characteristic of the quality of urban life. Our assumption is that the key characteristics are generally thought to reflect major societal concerns.

Our study did not include the establishing of preferred ends (as an example, goals or objectives which stipulate a minimum level of water purity). Nor did the task include establishing performance indicators, which in any event would have required us to establish preferred ends. Simply put, we have used measures of "what is," not of "what should be" nor of changes towards "what should be."

## WHY ARE URBAN INDICATORS USEFUL?

Notwithstanding the above limitations, urban indicators provide basic information about conditions in our cities. Thus, they make it possible for us to make choices as to what those cities should be. They provide a description of what is, as a prerequisite for influencing what will be. This implies a number of potential uses:

- monitoring conditions over time in order to identify improvement and deterioration in various key aspects of urban life;
- identifying problems which characterize specific cities;
- stimulating continuing discussion on the objectives of society and acceptable rates of progress towards these objectives;
- stimulating a search for more appropriate indicators and more useful ways of interpreting existing ones.

While the level of detail reflected in an urban indicator must be specific enough to focus on major areas of urban concern, it will not usually allow the evaluation of impacts of particular government programs. But although they paint too broad a picture to be of much use in measuring program costs relative to benefits, indicators can give a global picture of the conditions to which programs are addressed and measure changes in those conditions.

## WHY THESE PARTICULAR INDICATORS?

A number of quality-of-life indicators have been proposed in recent years. The few that have actually been developed derive from a variety of approaches and data sources.[1]

For example, Perspective Canada: A Compendium of Social Statistics, prepared by Statistics Canada in 1974, is intended to be "a statistical portrait of the Canadian people, their activities, and their environments."[2] A number of themes are developed which focus on the individual, are social rather than economic in content, and are at least minimally quantified.[3] However, as in any report limited to currently available data, indicators of "results" or "outputs" are not always possible. Instead

1. Selected works in the area are listed in the suggested readings.

2. Statistics Canada: Perspective Canada: A COMPENDIUM OF SOCIAL STATISTICS. Ottawa: Information Canada, 1974, p. xxi.

3. Ibid, xxii.

statistics dealing with inputs, costs, and means have been used.

In contrast to this approach, the system of social indicators under development by the Organization for Economic Cooperation and Development takes as its starting point the definition of "primary goal areas." From these, more specific "social concerns" and "sub-concerns" are identified and eventually indicators are proposed. Such an approach may produce a comprehensive set of proposed indicators, but it is by no means certain that data currently exists or will eventually exist to measure these. Work published by the Economic Council of Canada appears to reflect roughly the same dilemma.[4]

Other approaches emphasize the subjective aspect of indicators, and attempt through surveys to measure perceived levels of satisfaction. This produces very different indicators requiring very different data from the more comprehensive and objective approaches outlined above.

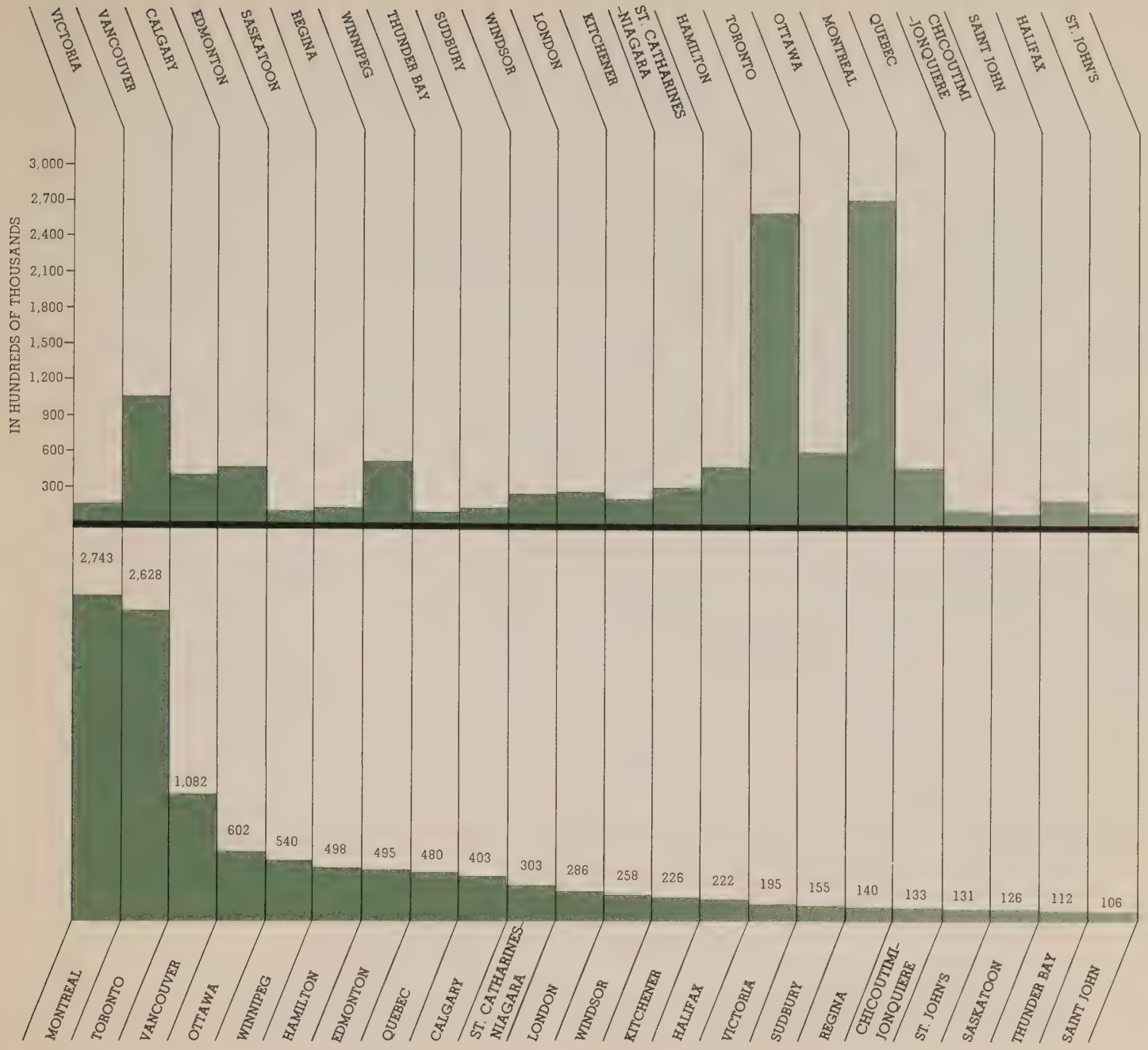
Although our approach is perhaps most similar to that of Perspective Canada, we have used an urban focus and have attempted to use indicators more selectively, according to pre-determined criteria. The indicators presented here were selected on the basis of five criteria.
(i) Comprehensiveness. The areas of concern include demographic characteristics, recreation, criminality, education, cultural opportunity, health, income, employment, housing, air quality, and transportation. Although we make no pretense that this listing is exhaustive, or even preferable to other possible listings, it does parallel frameworks established in a number of social indicator studies and approximates sectors of government activity.
(ii) Availability of data for the 22 Canadian census metropolitan areas (CMAs). In some cases, special tabulations were required to obtain data at this level, while in other cases potential indicators were eliminated because data were available only for major economic regions or for a province as a whole. Where it was necessary to aggregate from constituent municipalities, some data had to be reported for a smaller area than the entire census metropolitan area. In every case, however, the major city is included.

The original intent of the study was to go beyond comparison of metropolitan areas to comparisons of communities within the metropolis. Unfortunately, problems of definition between suburbs and the inner city, lack of disaggregated data in some cases and the amount of calculation and computation in others, made this impossible.
(iii) Reliability and accuracy. As far as possible, the quality of the data source was checked. Many possible indicators were excluded because of inconsistencies in definition of terms, inadequate sampling, or methodological problems.
(iv) Validity. It is important to establish what aspect of the quality of life an indicator measures and to select indicators which are both understandable and meaningful.
(v) Topicality. It is difficult to speak to current and future issues with out-dated information. Given the conditions of existing data, however, this criterion remains largely unmet.

The thirty-two indicators are the result of

4. Henderson, D.W., SOCIAL INDICATORS: A RATIONALE AND RESEARCH FRAMEWORK. Economic Council of Canada, Ottawa: Information Canada, 1974.

# 1971 POPULATIONS OF THE 22CMAs*




*A census metropolitan area is defined generally as the main labour market area that includes and surrounds a continuous built-up area, where the latter has a population of 100,000 or more.

applying these criteria to existing data. These indicators represent only one view of the quality of life in our metropolitan areas. Thus the deficiencies and gaps in coverage are as important as the indicators themselves. Lack of good data at the metropolitan level in a number of areas—health, income, air quality, and land use, in particular—should raise questions about how far discussion of problems in these areas can proceed. Difficulties in interpreting the indicators presented here may reflect gaps in our understanding of what are the desirable and the undesirable qualities of urban life. Finally, questions about the appropriateness of our measures for evaluating the quality of life may stimulate discussion and lead to better indicators and alternative strategies for data collection.

## HOW ARE INDICATORS INTERPRETED?

Indicators can be both used and abused. The format we have chosen for presenting data is intended to facilitate certain uses and at the same time to provide checks against abuses. Thus we rank metropolitan areas from "best" to "worst" and also provide graphic comparisons between broad geographical regions. In both instances, we have avoided setting out ideal conditions or preferred ends while permitting relative assessment of conditions in specific metropolitan areas. We have done this in order to focus debate.

In assessing relative conditions, we must be aware that all indicators have the inherent possibility of measurement error. Hence they should be interpreted as an order of magnitude even though specific values are given. Accordingly, a preferable basis for a city-to-city comparison is the comparison of one city to the average values for a number of other cities. To facilitate this interpretation, cities are clustered in groups of three. An approximate value for the group average may be readily calculated.

The graphic presentations should permit preliminary conclusions with respect to other criteria. Plotting relationships geographically is one approach to discovering underlying factors. Certain patterns may suggest the interplay of broad historic or cultural forces, or they may suggest that forces unique to one city are at play.

Another, perhaps more sophisticated, approach would be to test statistically the relationship between some burning policy issue and each urban indicator. For example, city size and growth may be strongly related (positively or negatively) to certain indicators of the quality of urban life. We undertook to examine these sorts of relationships, and concluded that there are few significant associations. Our results are in the Technical Appendix,

One other matter deserves attention. Do the thirty-two indicators measure independent aspects of the urban condition, or could fewer indicators serve the same purpose? Do "summary indicators" exist? The statistical tests that we used to answer this question show that, with few exceptions, the indicators are independent and hence measure different aspects of the quality of life. Again, the results of these tests are detailed in the Technical Appendix.

## FUTURE DIRECTIONS

Our recommendations for future work derive from our experience in developing these indicators, and our review of work completed or underway in other federal departments or

agencies.[5] Our experience suggests that since we found a scarcity of good, useful and readily accessible data for policy purposes, another comprehensive urban indicators project is not yet justified. The indicators presented here represent fairly well the extent of consistent, comparable data now available across Canadian metropolitan areas. This is perhaps not surprising, since data is collected to satisfy specific sectoral needs rather than provide answers to the more general concerns raised here.

If our work to date is to be useful for future application, existing indicators should be improved and new ones developed each year, in anticipation of emerging or shifting policy priorities. Steps which could be taken to improve our indicators include:

(i) Extension of Coverage to Intermediate and Smaller Communities. Data are available for intermediate and smaller communities for some, but not all, indicators.

(It is possible, however, that some indicators are appropriate solely for assessing conditions in smaller cities and others solely for larger cities.)

(ii) Extension of Within-City Coverage. Conditions may vary as much within a given city as between cities, if not more. This is assuredly the case, for example, with socio-economic distribution, where there is a significantly lower socio-economic level in the inner cities than in the suburbs.

(iii) Addition of a Temporal Dimension. The way in which conditions change over time is of great interest. Annual reports would be satisfactory for most purposes, providing that they are up-to-date.

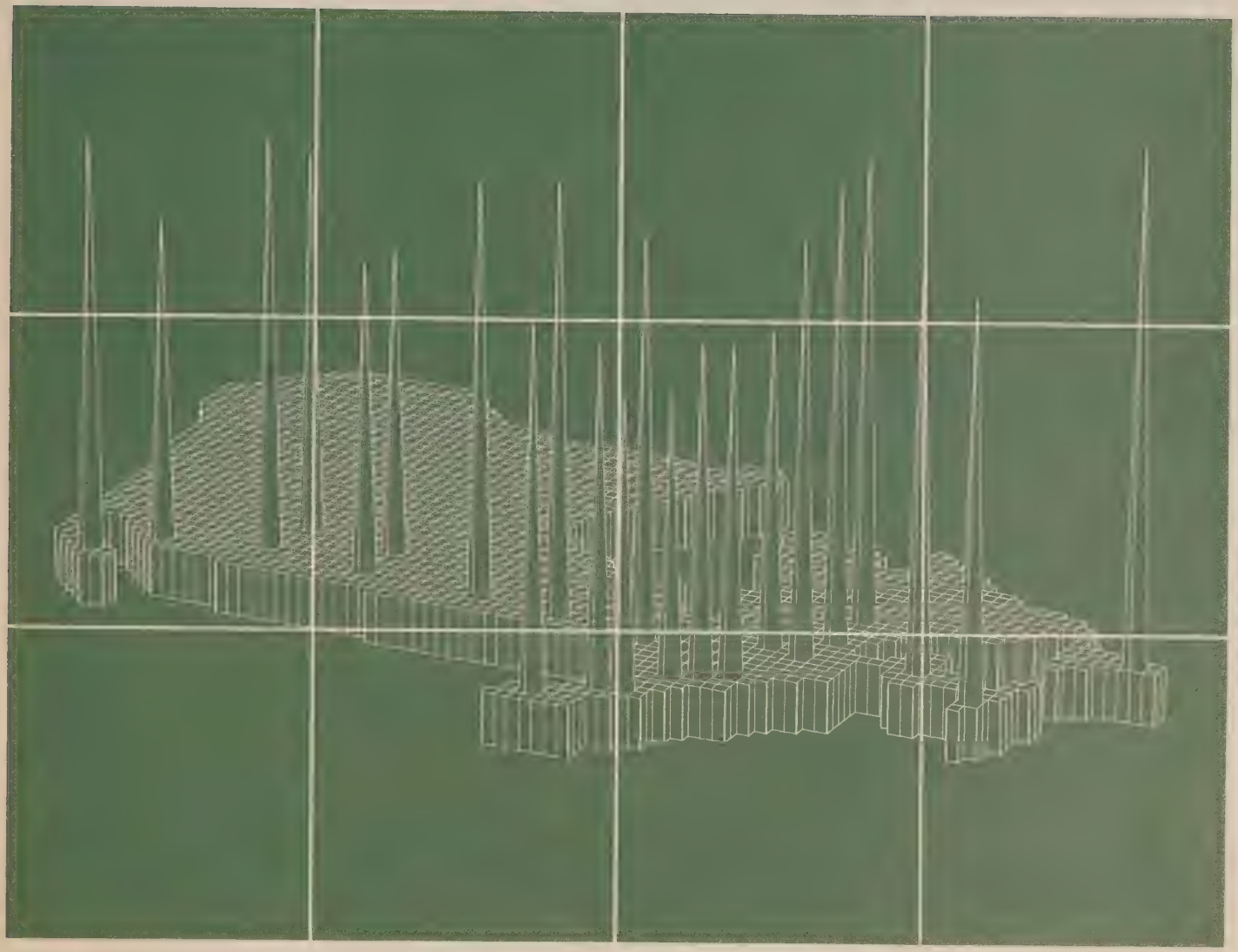
(iv) Standardizing Data for Demographic Structure, Employment Structure, etc. Differences on some indicators may be accounted for by differences in the underlying demographic or industrial structure rather than more complex socio-economic or attitudinal factors. For example, criminal offense rates are much higher for persons aged 15 to 34 than for other age groups. The proportion of population in this age group may vary by city and higher rates of criminality may reflect only this factor. Data should be standardized to take account of this.

(v) Adding National, Urban and Metropolitan Averages. Averages (arithmetic mean or median) are summary measures which can be readily applied in making comparisons. As reference points, they facilitate comparison without encouraging non-productive debate on the condition of city X relative to city Y.

Improving and maintaining the existing urban indicators is a starting point for constructing a more comprehensive set of indicators. First, the reconsideration of relevant data sources should uncover new indicators. Second, a longer-range project will facilitate contact with other agencies undertaking similar projects. Third, it is possible to develop further new urban indicators by each year selecting one or two sectors of greatest concern for improving the quality of urban life.

[5] Leon Beaudouin, "RECHERCHE DU GOUVERNEMENT FÉDÉRAL EN MATIÈRE D'INDICATEURS DE LA QUALITÉ DE LA VIE," (unpublished manuscript), Ministre d'Etat chargé des Affaires urbaines, October 22, 1974.

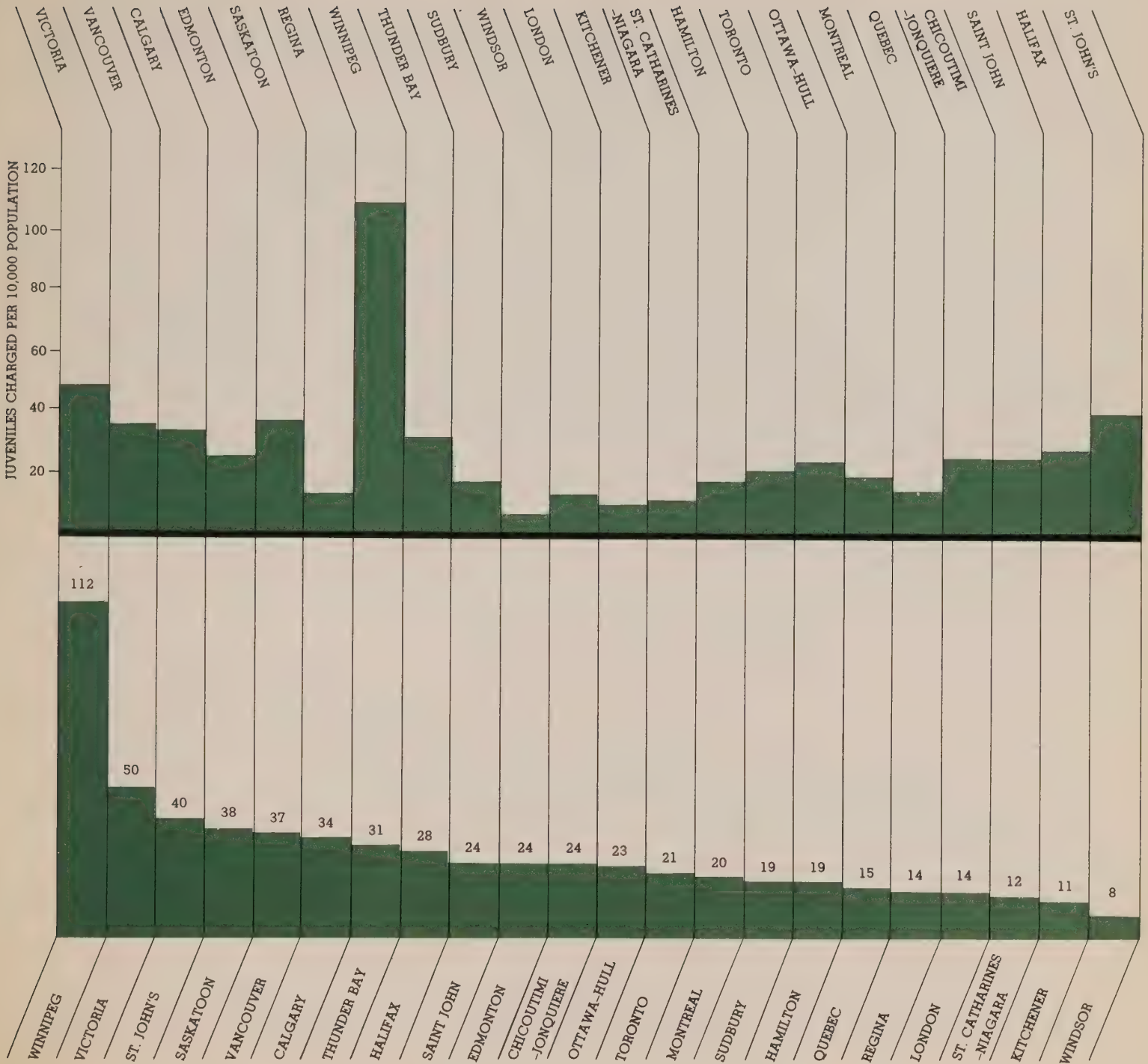
# SOCIAL DEVELOPMENT



| | |
|---|---|
| ASPECT MEASURED | The number of juveniles charged reflects criminality within that particular sector of the population. Juvenile crime may also indicate family problems and the need for treatment and services at that level. The juvenile population includes those aged 7 to 15, adjusted for those provinces where the juvenile age limit was either under 17 or under 18 years of age. |
| CONSIDERATION OF THE MEASURE | 1. AREA COVERAGE<br>The data are collected by the police force in each municipality and consequently the area covered is that of the jurisdiction of the local police force. This will usually be the major city or major cities within the census metropolitan area.<br>2. TEMPORAL COVERAGE<br>Police statistics are gathered annually.<br>3. OTHER COVERAGE INCOMPATIBILITIES<br>Reporting is done on the basis of the Uniform Crime Reporting System, based on common definitions. The quality and comparability of the data are consequently dependent on the extent to which local police statistics are accurately recorded in the standardized terms. Variations in reporting of offenses by citizens and by police may also exist between CMAs. No account has been taken of the differing percentage of juveniles in individual major urban areas. This could be estimated to better reflect the number of offenses among the population of concern.<br>4. COLLECTION<br>Police departments send monthly crime statistics returns to Statistics Canada, which publishes annual totals in Catalogue 85–205.<br>5. COMPUTATION<br>Figures are taken directly from published data. |
| OTHER MEASURES | Rates of juveniles charged can be specified for particular types of crime. It is also possible to consider correctional institutions for juveniles and the consequences of conviction and sentencing as found in Catalogues 85–202 and 85–208. |

SOURCE:
Police Crime Statistics, Catalogue 85-205, Statistics Canada, 1971.

# JUVENILES CHARGED



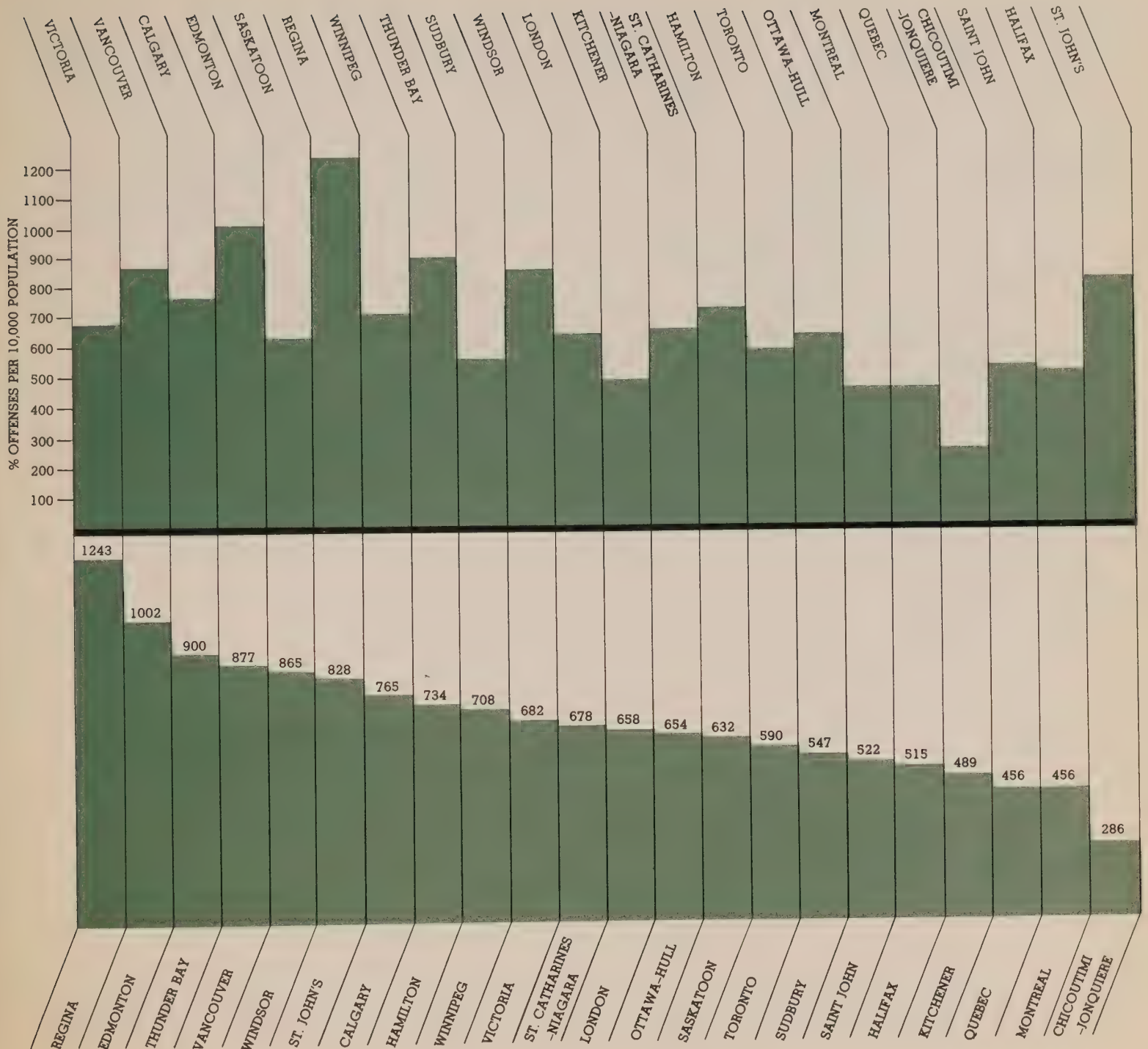
| | | |
|---|---|---|
| ASPECT MEASURED | Rate of criminal code offenses is a general indicator of crime committed. It is based on the number of incidents reported to police and includes most major crimes against persons and property.[1] It represents the | overall level of unlawful activity in a city more than it represents the likelihood of crimes committed against any single individual. |
| CONSIDERATION OF THE MEASURE | 1. AREA COVERAGE<br>The data are collected by the police force in each municipality and consequently the area covered is that of the jurisdiction of the local police force. This will usually be the major city or major cities within the census metropolitan area.<br>2. TEMPORAL COVERAGE<br>Police statistics are gathered annually.<br>3. OTHER COVERAGE INCOMPATIBILITIES<br>Reporting is done on the basis of the Uniform Crime Reporting System, based on common definitions. The quality and comparability of the data are consequently dependent on the extent to which local police statistics are accurately recorded in the standardized terms. Variations in reporting of offenses by citizens and by police may also exist between cities. Rates of offenses are known to vary | with age group, but account has not been taken of variations in age structure by major urban area. Estimates of this could be obtained, however.<br>4. COLLECTION<br>Police departments send monthly crime statistics returns to Statistics Canada, which publishes annual totals in Catalogue 85–205.<br>5. COMPUTATION<br>Figures are taken directly from published data divided by 1971 Census populations. |
| OTHER MEASURES | Rates for specific offenses can be used to emphasize types of crime, as for example against property or persons. These are not broken down in the published data for major urban areas. It would, however, be instructive to compare rates of violent crimes between cities and even between the core and | suburbs of individual cities. As mentioned above, the data should be standardized for age structure. |

[1] These include murder, attempted murder, manslaughter, rape, other sexual offenses, wounding, assault, robbery, breaking and entering, motor vehicle theft, theft over $50, theft $50 and under, possession of stolen goods, fraud, prostitution, gaming and betting, use or possession of offensive weapons, and other criminal code offenses.

SOURCE:
Police Crime Statistics, Catalogue 85–205, Statistics Canada, 1971.

SOCIAL DEVELOPMENT # 2

# CRIMINAL CODE OFFENSES



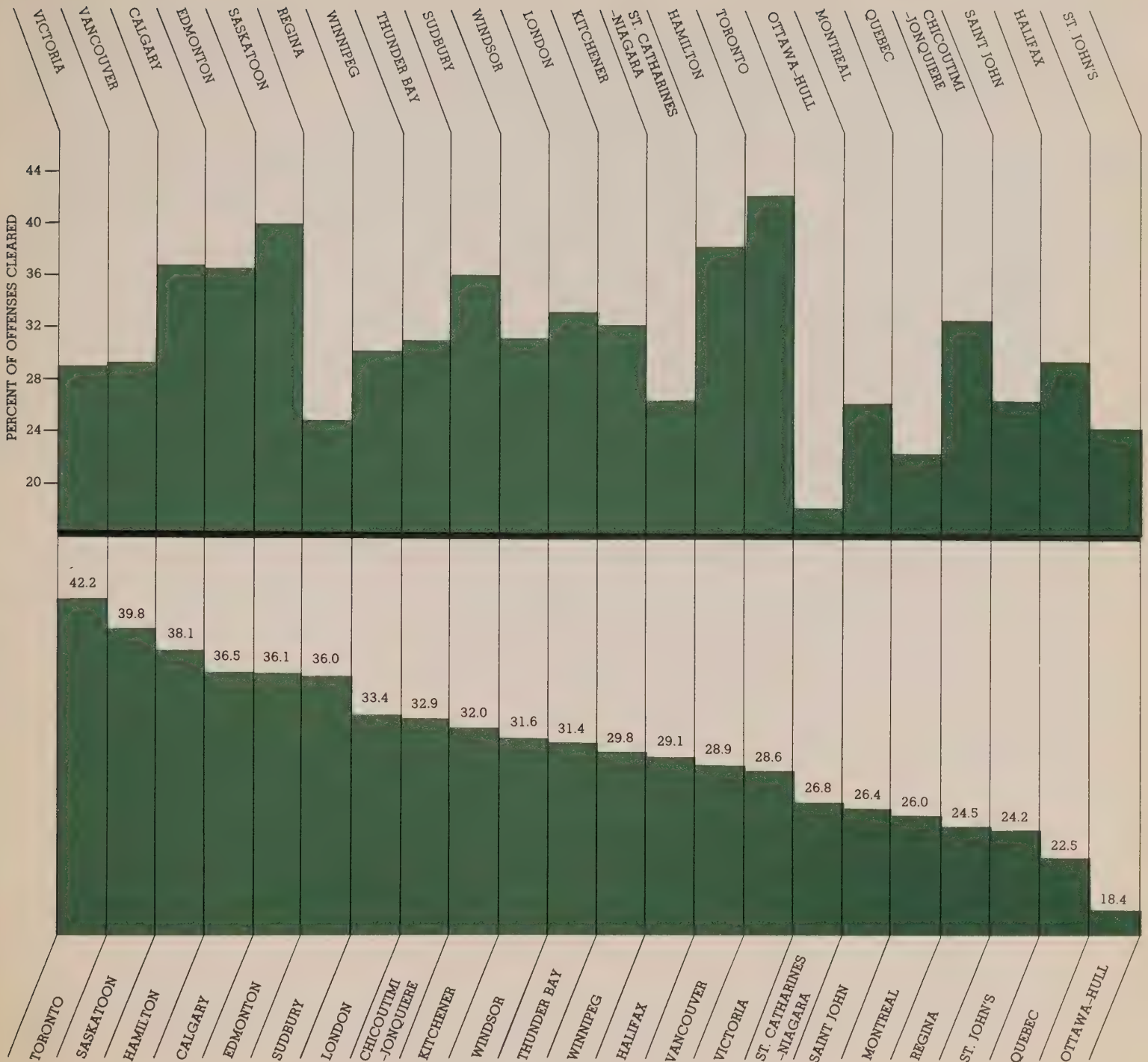
| | | |
|---|---|---|
| ASPECT MEASURED | The percent of offenses cleared is to a large extent a measure of the effectiveness of local police forces. Offenses are usually cleared as a result of a charge being laid. Thus the measure reflects the extent to which crimes are resolved. | |
| CONSIDERATION OF THE MEASURE | 1. AREA COVERAGE<br>The data are collected by the police force in each municipality and consequently the area covered is that of the jurisdiction of the local police force. This will usually be the major city or major cities within the census metropolitan area.<br>2. TEMPORAL COVERAGE<br>Police statistics are gathered annually.<br>3. OTHER COVERAGE INCOMPATIBILITIES<br>Reporting is done on the basis of the Uniform Crime Reporting System, based on common definitions. The quality and comparability of the data are consequently dependent on the extent to which local police statistics are accurately recorded in the standardized terms. Variations in reporting of offenses by citizens and by police may also exist between CMAs.<br>Crimes against property (theft, breaking and entering) have particularly low probabilities of being cleared. Thus cities with a high percentage of these types of crimes will tend to have lower percentages of offenses cleared.<br>Differences in the distribution of types of crime among CMAs may consequently account for some of the variation in clearing. | 4. COLLECTION<br>Police departments send monthly crime statistics returns to Statistics Canada, which publishes annual totals in Catalogue 85–205.<br>5. COMPUTATION<br>Figures are compiled directly from published data. |
| OTHER MEASURES | CMAs could be compared according to percentages of offenses cleared for specific crimes to increase comparability. Data were not readily available for reporting specific crime categories such as violent crimes. It is also possible to follow the process further and consider the court results of charges laid in terms of convictions and sentences. | |

SOURCE:
Police Crime Statistics, Catalogue 85–205, Statistics Canada, 1971.

*An offense is cleared either when a charge has been laid or there is reasonable proof that the offender has been identified although no charge may be laid due to such factors as the offender being outside police jurisdiction, death of the offender, etc.

SOCIAL DEVELOPMENT # 3

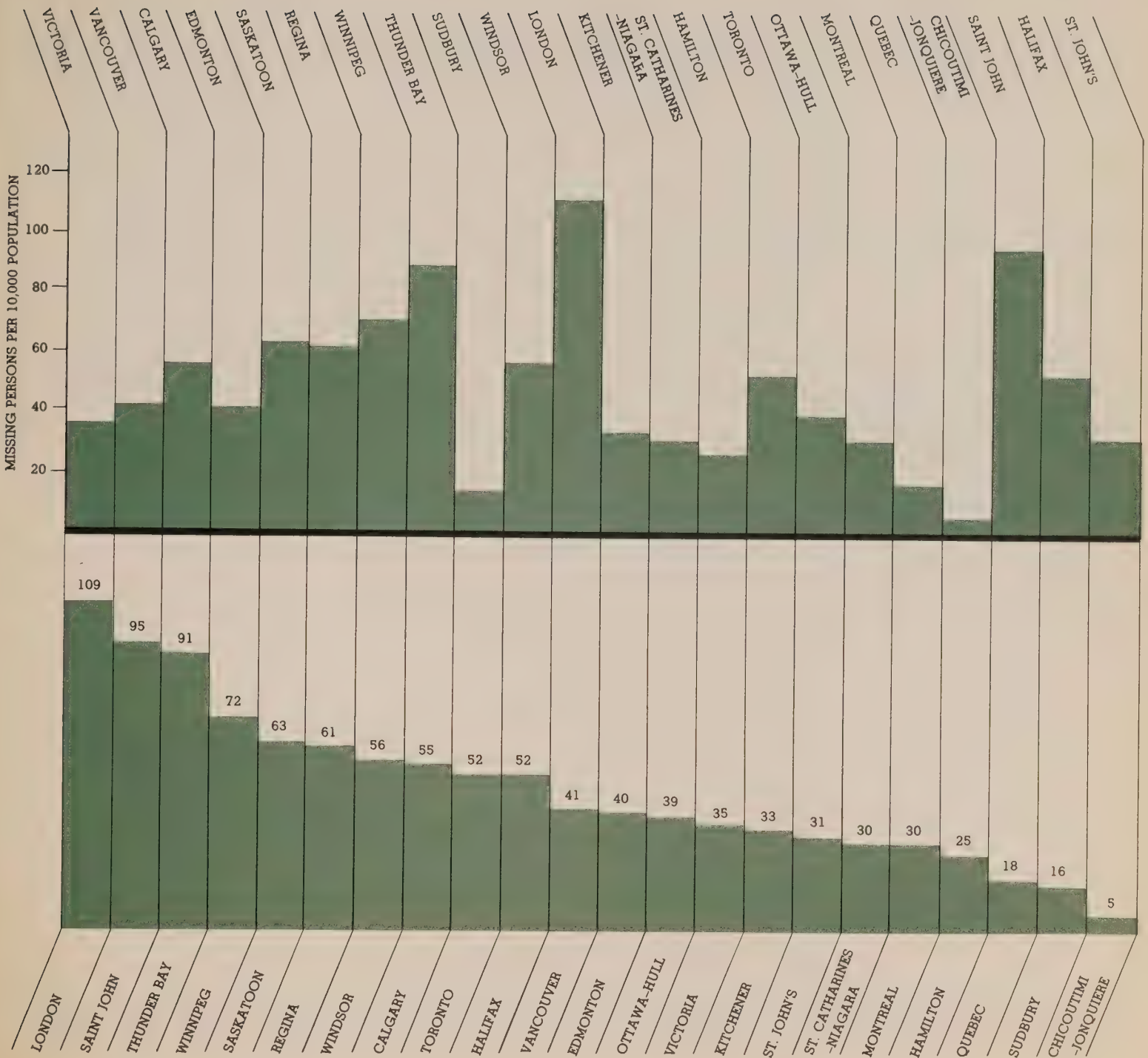
# OFFENSES CLEARED*



| | | |
|---|---|---|
| ASPECT MEASURED | The number of missing persons is a measure of social and family disorganization and of the existence of social problems. Missing persons tend to be juvenile runaways or spouses who have left their families, and in each case reflect the breakdown of social relationships. | |
| CONSIDERATION OF THE MEASURE | 1. AREA COVERAGE<br>The data are collected by the police force in each municipality and consequently the area covered is that of the jurisdiction of the local police force. This will usually be the major city or major cities within the census metropolitan area. Consequently the area coverage can vary substantially.<br>2. TEMPORAL COVERAGE<br>Police statistics are gathered annually.<br>3. OTHER COVERAGE INCOMPATIBILITIES<br>Reporting is done on the basis of the Uniform Crime Reporting System, based on common definitions. The quality and comparability of the data are consequently dependent on the extent to which local police statistics are accurately recorded in the standardized terms. Variations in reporting of offenses by citizens and by police may also exist between CMAs.<br>No accounting has been given here to differing age structures by major urban areas. This could be estimated. | 4. COLLECTION<br>Police departments send monthly crime statistics returns to Statistics Canada, which published annual totals in Catalogue 85-205.<br>5. COMPUTATION<br>Figures are taken directly from published data. |
| OTHER MEASURES | Social and family disorganization may also be reflected in other measures of family breakup such as divorce, incidence of single-parent families, and family court cases. Social disorganization in its extreme forms may be reflected in suicide rates and admissions to mental institutions, although data on these are not comparable due to differences in reporting and availability of facilities, respectively. | |

SOURCE:
Police Crime Statistics, Catalogue 85–205, Statistics Canada, 1971.

# MISSING PERSONS



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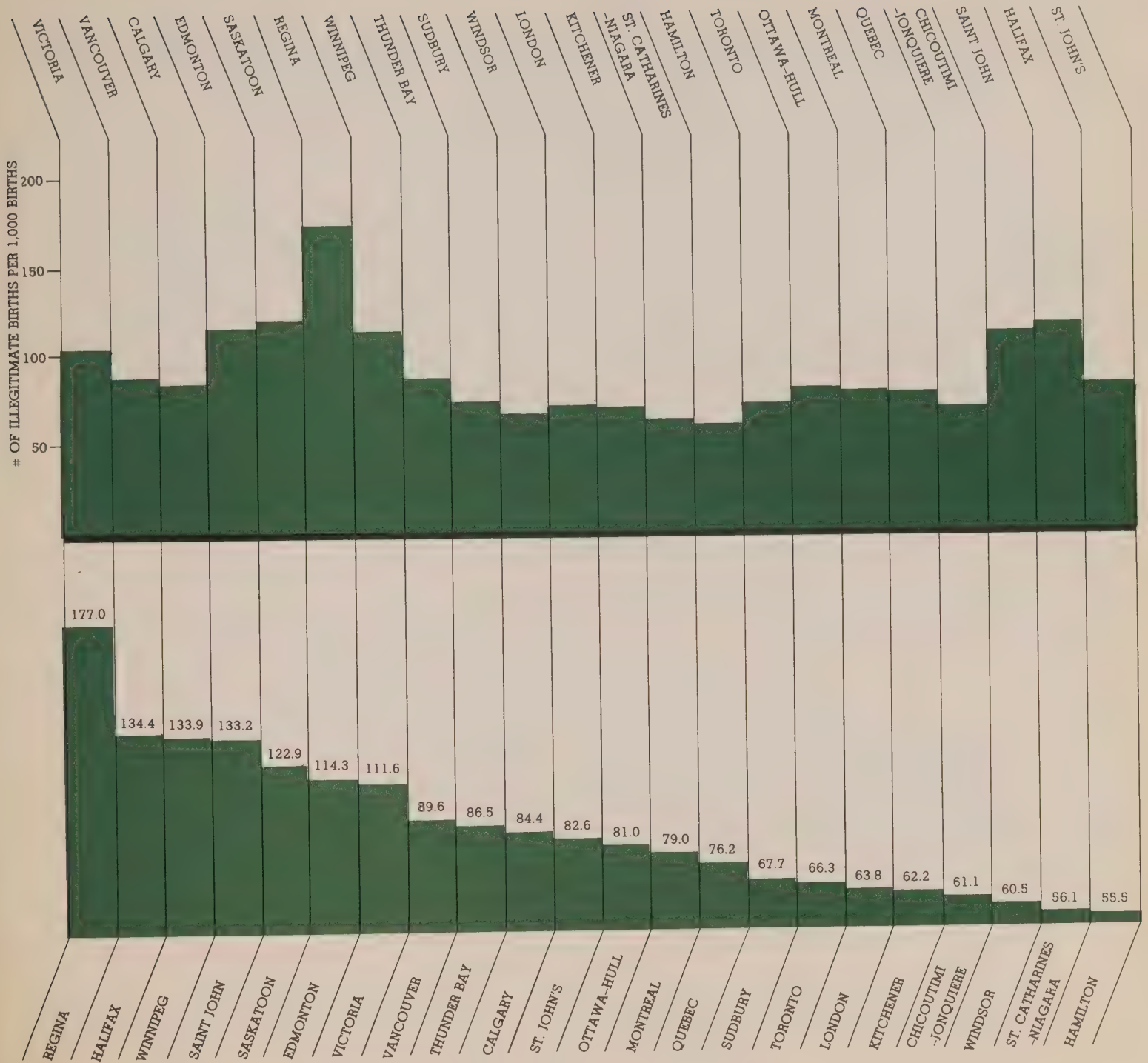
|---|---|---|
| ASPECT MEASURED | The number of illegitimate births reflects the extent of social disorder in that it may indicate a lack of the usual family structure. While it is not certain that illegitimate children will lack the presence of a father, it is likely that this will be the case. It can be expected that problems will arise in providing for the needs of such children, with resultant demands on the social welfare system in the cities affected. | |
| CONSIDERATION OF THE MEASURE | 1. AREA COVERAGE<br>Data are available for CMAs and other major urban areas, as well as at the provincial and census division level.<br>2. TEMPORAL COVERAGE<br>Data are collected annually, and are available in August for the preceding year.<br>3. OTHER COVERAGE<br>INCOMPATIBILITIES<br>The definition of "illegitimate" used in the data presented here has some inconsistencies. Children are illegitimate if no legal father is named, i.e. a husband of the mother. If the mother is unwed at the time of birth but intends to marry and the father agrees to be named as a parent, the child is considered legitimate. If the mother is married, but claims the child to be the offspring of a man other than her husband, the legitimacy of the child depends on the willingness of the husband to accept the child into his household.<br>Additionally, there is some provincial variation in the definition used. In the future, only the marital status of the mother will be recorded, making the defintion of "illegitimate" more objective, but less precise. Because they are recorded at the hospital, the data reflect place of birth of the child, not necessarily the place of residence of the mother. | 4. COLLECTION<br>The data are collected by local registrars and forwarded to the provinces, who in turn supply Statistics Canada. Data at the provincial and census division level are published in Catalogue 84–204. CMA and major urban area data are compiled but not published.<br>5. COMPUTATION<br>The computation is a simple ratio of illegitimate births to total births, the latter from the same source. |
| OTHER MEASURES | This indicator reflects only the circumstances of births of illegitimate children, and nothing of the subsequent conditions of life. Data on children placed under the care of Children's Aid societies and in foster homes would provide a better view of the consequences of illegitimacy. Other indicators of social cohesion and order are not readily available. | SOURCE:<br>Unpublished Data, Vital Statistics Section, Statistics Canada. |

# ILLEGITIMACY



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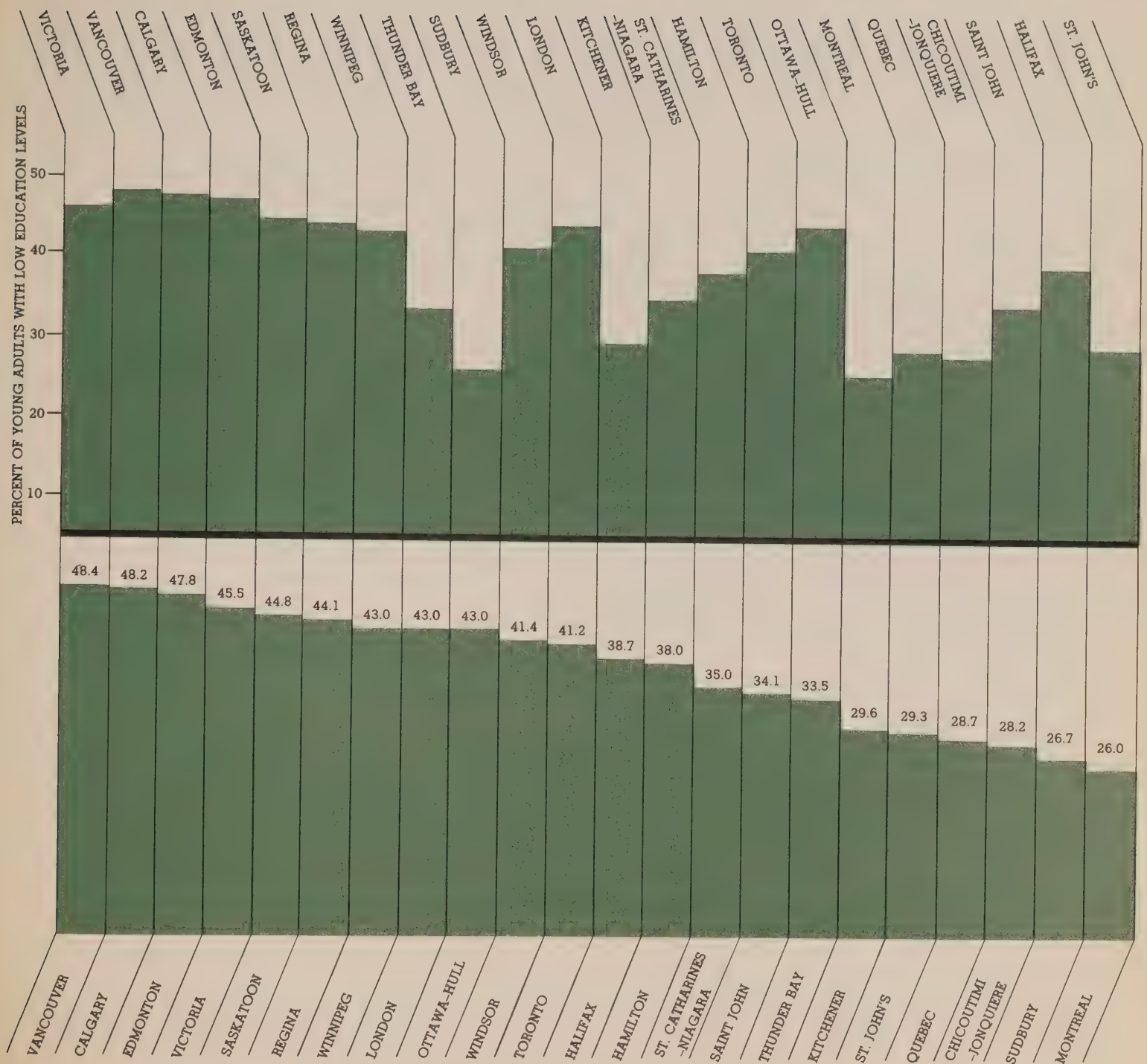
|---|---|---|
| ASPECT MEASURED | This education indicator measures the proportion of people in each city who do not possess the usual educational requirements for obtaining employment.<br>The 20–34 age group is emphasized because it is these people who tend not to have the years of experience that might offset their lack of education. With no more than a grade 10 education, it is likely that this group | will have difficulty finding satisfactory employment in urban areas. More generally, it is likely that lack of education will inhibit people from participating fully in activities within their communities. |
| CONSIDERATION OF THE MEASURE | 1. AREA COVERAGE<br>In addition to the 22 CMAs, data are available at the level of the provinces.<br>2. TEMPORAL COVERAGE<br>Data are collected for census years only.<br>3. OTHER COVERAGE INCOMPATIBILITIES<br>None are readily apparent.<br>4. COLLECTION<br>The data are collected by Statistics Canada as part of the census and published in 1971 Census of Canada Catalogue 92–743, 1974.<br>5. COMPUTATION<br>The computation is a straightforward percentaging of those with grade 10 education or less over the total number of persons for whom data exists. | |
| OTHER MEASURES | This measure focuses on those people with less than average education. It is also possible to compare percentages of those who are highly educated.<br>Median education level is difficult to compute because the highest and lowest categories are not finite (for example the lowest category is those having less than grade 8). | |

SOURCE:
Statistics Canada, 1971 Census of Canada, Catalogue 92–743, 1974.

# EDUCATION LEVEL



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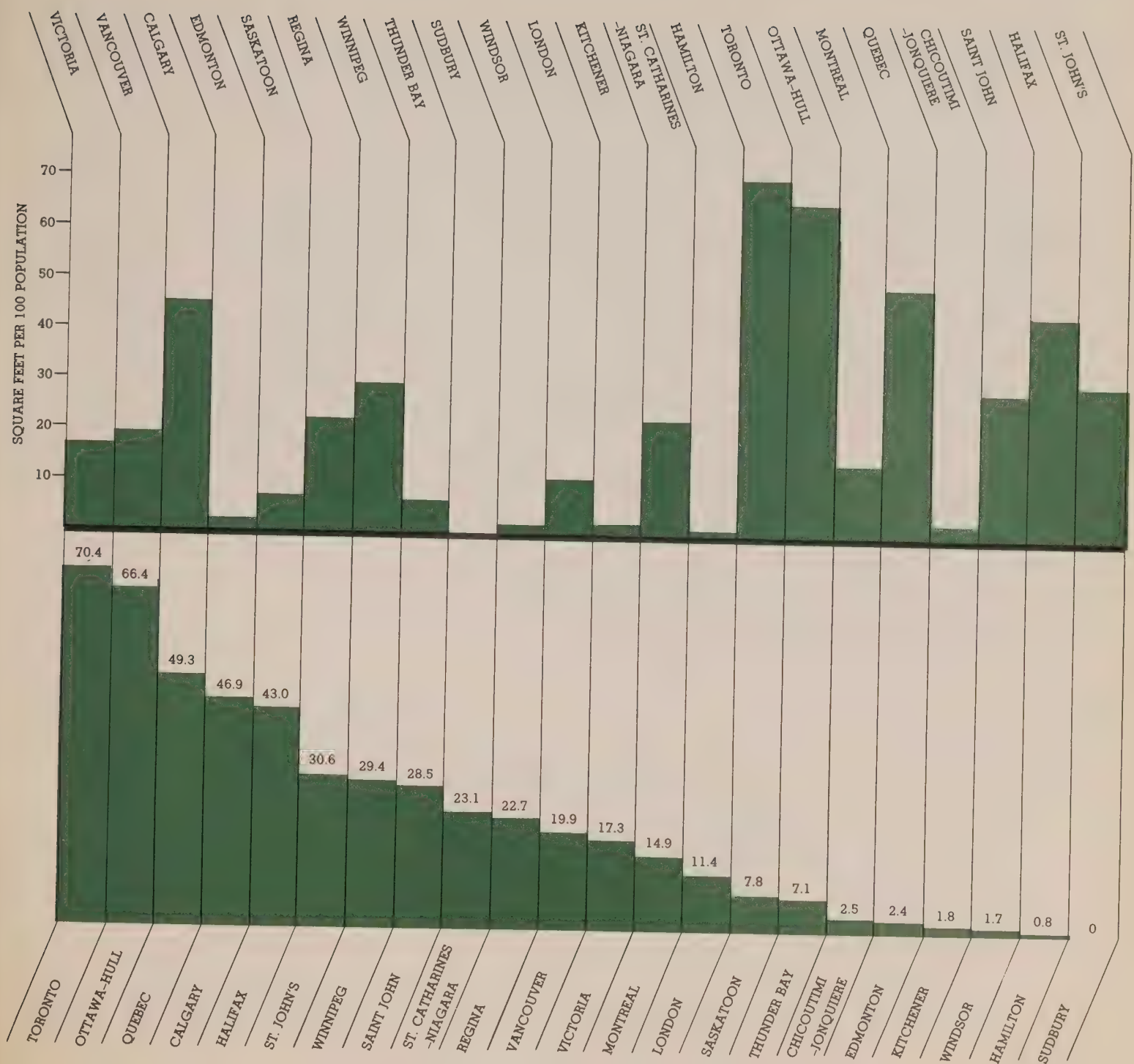
| ASPECT MEASURED | The area per 100 population of exhibition halls, museums and art galleries is a measure of the cultural, artistic, and historical opportunities offered by each metropolitan area. For the purposes of the Recreation Canada survey these facilities were defined as follows:<br>a) Museum: Public exhibition area for historical artifacts or specialized displays of particular aspects of culture: art, science, technology, etc. This exhibition primarily serves educational ends. The museum usually collects works and objects, repairs (if necessary) and exhibits them to the public. | b) Art gallery: Area specializing in the public exhibition of art objects for sale.<br>c) Exhibition hall: Area used for a limited time to exhibit collections of works or objects for promotion purposes: e.g. exhibition halls in which there are annual auto shows, displays of camping equipment, fashion shows, etc. Only the interior space within such facilities is considered here. |
| CONSIDERATION OF THE MEASURE | 1. AREA COVERAGE<br>The data were collected by Recreation Canada for 1800 municipalities which have been aggregated here to approximate the census metropolitan areas.<br>2. TEMPORAL COVERAGE<br>No continual collection of data exists or is foreseen. The data were collected for the purposes of a single study which is now complete. The data could be updated with provincial cooperation to be made available on a regular basis.<br>3. OTHER COVERAGE INCOMPATIBILITIES<br>The interior area of the facility includes the walking area as well as the exhibition area and it is quite likely that this may include many areas which add little to the cultural value of such expositions.<br>4. COLLECTION<br>The data were collected by teams of field researchers in each of the provinces and coordinated by Recreation Canada in Ottawa. | 5. COMPUTATION<br>The data on exhibition halls, museums and art galleries were aggregated from the Recreation Canada municipalities to approximate the population in each of the 22 CMAs, and divided by the 1971 population of the CMA approximations. |
| OTHER MEASURES | The Recreation Canada study also provides data on exhibition halls, museums and art galleries administered by non-governmental and private organizations. | |

SOURCE:
Special tabulation from the National Study on the Supply and Demand for Sports and Recreation Facilities, Phase II: Inventory of Socio-Cultural Facilities, Recreation Canada, 1974.
*Includes only facilities administered by federal, provincial, regional or municipal governments.

SOCIAL DEVELOPMENT # 7

# CULTURAL FACILITIES*



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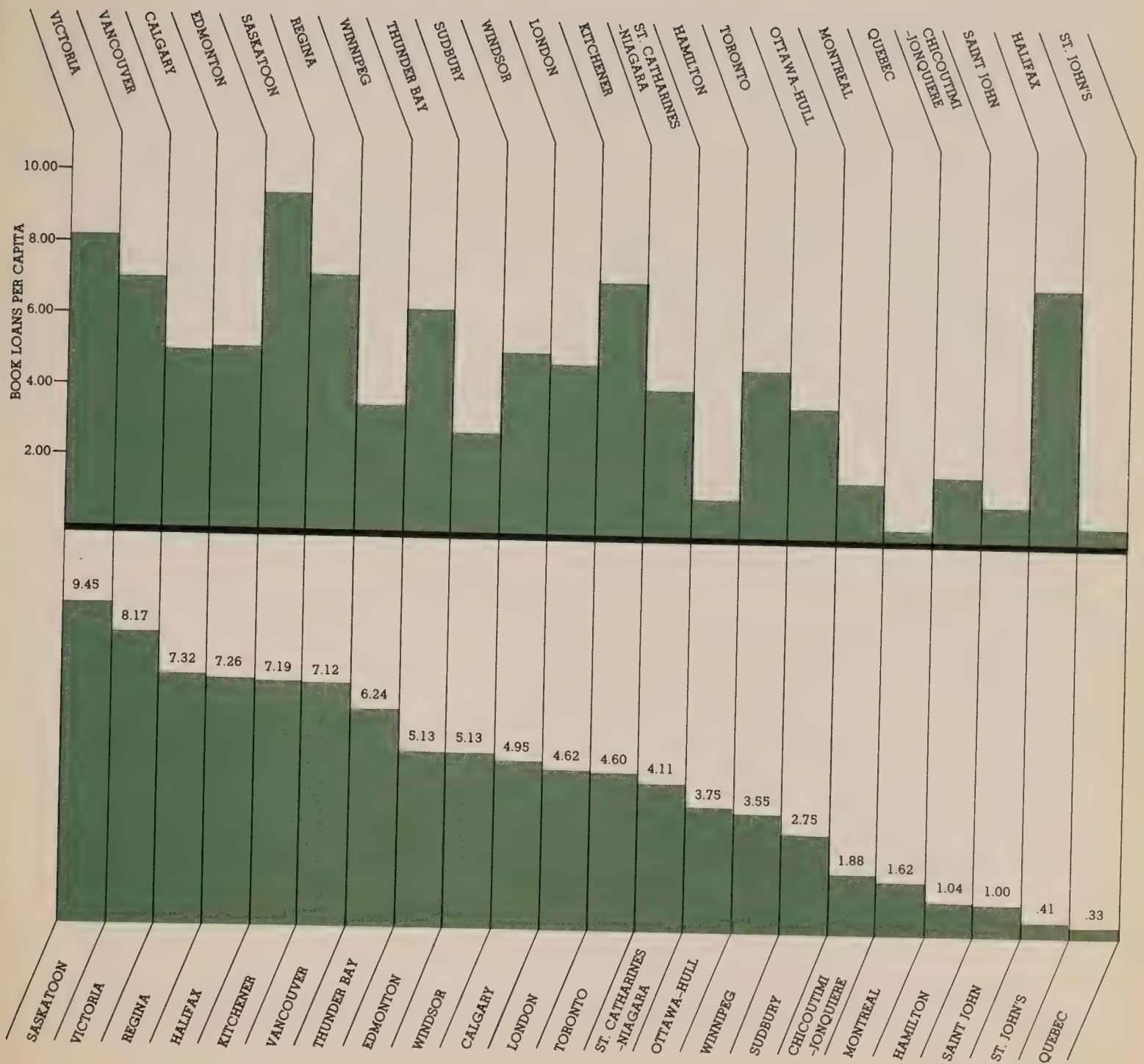
| ASPECT MEASURED | The number of books loaned per capita provides a measure of the interest that the population of each CMA has in reading. Loans reflect both the availability of library books and libraries and the extent to which they are used. Since the indicator comprises municipal and regional libraries only, it is primarily a measure of recreation library usage by the general public. |
| CONSIDERATION OF THE MEASURE | 1. AREA COVERAGE<br>The data were collected by Recreation Canada for 1800 municipalities which have been aggregated here to approximate the census metropolitan areas.<br>2. TEMPORAL COVERAGE<br>No continual collection of data exists or is foreseen. The data were collected for the purposes of a single study which is now complete. The data could be updated with provincial cooperation to be available on a regular basis.<br>3. OTHER COVERAGE INCOMPATIBILITIES<br>While this measure reflects the number of loans made, it is impossible to identify whether these tend to be the same books loaned repeatedly or different books borrowed from an extensive collection. Thus the measure does not reflect the range of choice. It is also possible that books may have been obtained through inter-library loans from non-public institutions.<br>4. COLLECTION<br>The data were collected by teams of field researchers in each of the provinces and coordinated by Recreation Canada in Ottawa.<br>5. COMPUTATION<br>The data on books loaned were aggregated from the Recreation Canada municipalities to approximate the population in each of the 22 CMAs and divided by the 1971 population of the CMA approximations. |
| OTHER MEASURES | The Recreation Canada study also provides data on libraries operated by other public and private organizations, such as educational institutions, religious groups, etc. It is also possible to look at data on number of books, periodicals and childrens' books owned by libraries. Data collected by the same study provides an inventory of a number of other "socio-cultural facilities" including: art galeries, auditoriums (cinema, theatre, concert), exhibition halls, social meeting establishments, multi-purpose halls, museums, and studios. |

SOURCE:
Special tabulation from the National Study on the Supply and Demand for Sports and Recreational Facilities, Phase II: Inventory of Socio-Cultural Facilities, Recreation Canada, 1974.
*Includes only regional and municipal public libraries. Specialized libraries in universities and government offices are excluded as well as national and provincial archives.

SOCIAL DEVELOPMENT # 8

# PUBLIC LIBRARY USAGE*



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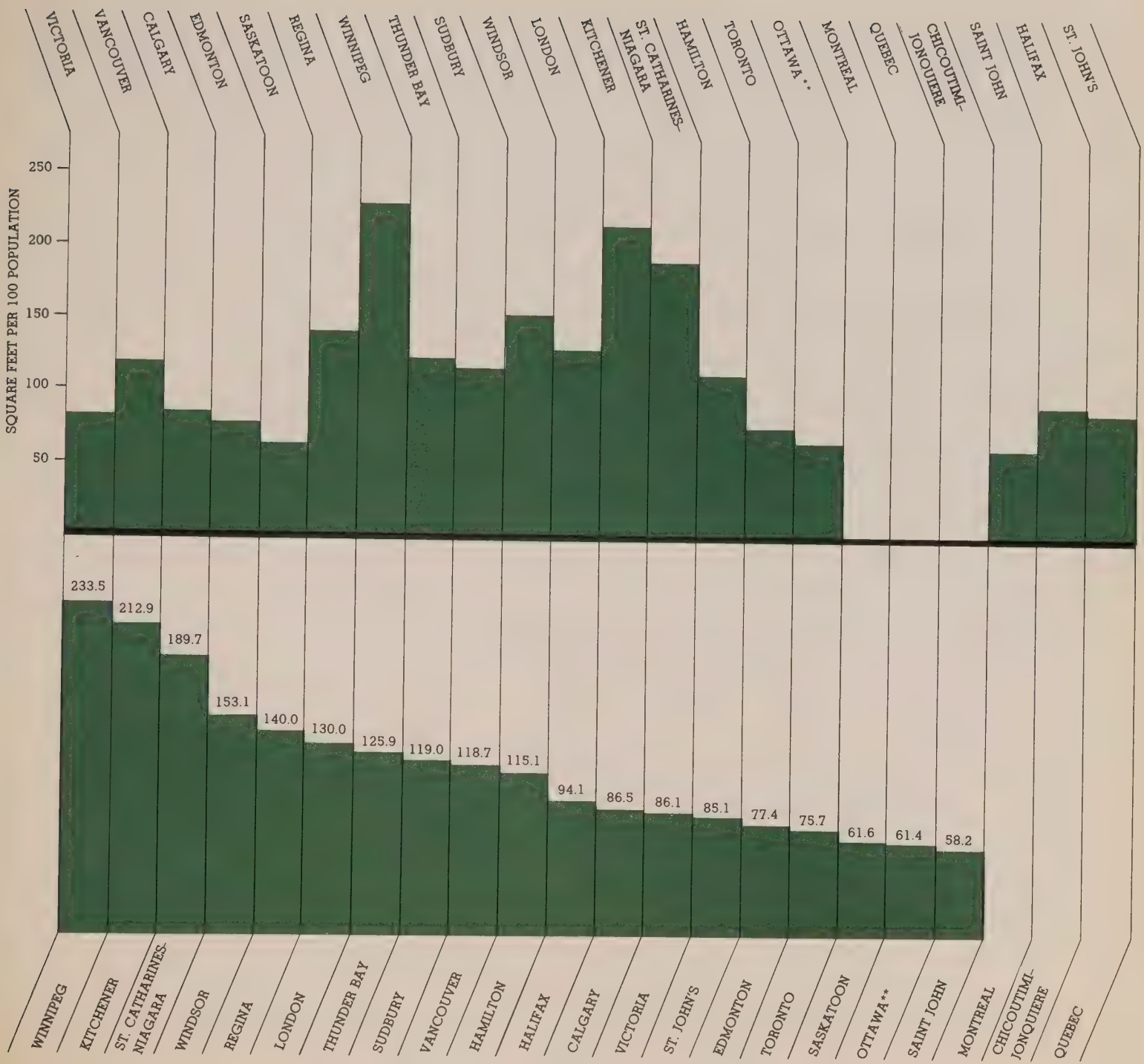
| ASPECT MEASURED | The area per capita of commercial meeting establishments provides a measure of the opportunities for entertainment in each CMA. These establishments are primarily ones which serve alcoholic beverages. Such places include taverns, lounges, night clubs, discotheques, and dance halls. | |
| CONSIDERATION OF THE MEASURE | 1. AREA COVERAGE<br>The data were collected by Recreation Canada for 1800 municipalities which have been aggregated here to approximate the census metropolitan areas. No data were collected for the province of Quebec.<br>2. TEMPORAL COVERAGE<br>No continual collection of data exists or is foreseen. The data were collected for the purposes of a single study which is now complete. The data could be updated with provincial cooperation and made available on a regular basis.<br>3. OTHER COVERAGE INCOMPATIBILITIES<br>It is extremely difficult to classify within a single category such a wide variety of social meeting establishments. Differences in liquor laws between provinces and the types of establishments common to each make comparisons difficult. As stated above, data were unavailable for the province of Quebec.<br>4. COLLECTION<br>The data were collected by teams of field researchers in each of the provinces and coordinated by Recreation Canada in Ottawa. Information concerning social meeting establishments can be obtained from specific government departments, such as liquor licencing boards.<br>5. COMPUTATION<br>The data on social meeting establishments were aggregated from the Recreation Canada municipalities to approximate the population in each of the 19 CMAs and divided by the 1971 population of the CMA approximations. An adjustment was made for Ottawa as data for Hull were unavailable. | |
| OTHER MEASURES | It is difficult to separate the establishments included in the measure into those which serve alcoholic beverages, those which have entertainment or dance floors and so on, because these facilities are often combined in the same establishment. Data collected by the same study provide an inventory of a number of other "socio-cultural facilities" including: art galleries, auditoriums (cinema, theatre, concert), exhibition halls, libraries, multi-purpose halls, museums, and studios.<br>It is also possible to obtain data on the number of works belonging to both public and private museums and galleries as well as wall area available for exhibitions. | Data collected by the same study provide an inventory of a number of other "socio-cultural facilities" including: libraries, commercial meeting establishments, multi-purpose halls, studies and auditoriums (cinema, theatre and concert).<br><br>SOURCE:<br>Special tabulation from the National Study on the Supply and Demand for Sports and Recreational Facilities, Phase II: Inventory of Socio-Cultural Facilities, Recreation Canada, 1974.<br>*Commercial Meeting Establishments are primarily ones which serve alcoholic beverages such as taverns, lounges, discotheques and dance halls.<br>**Does not include Hull or environs |

# SOCIAL OPPORTUNITIES*



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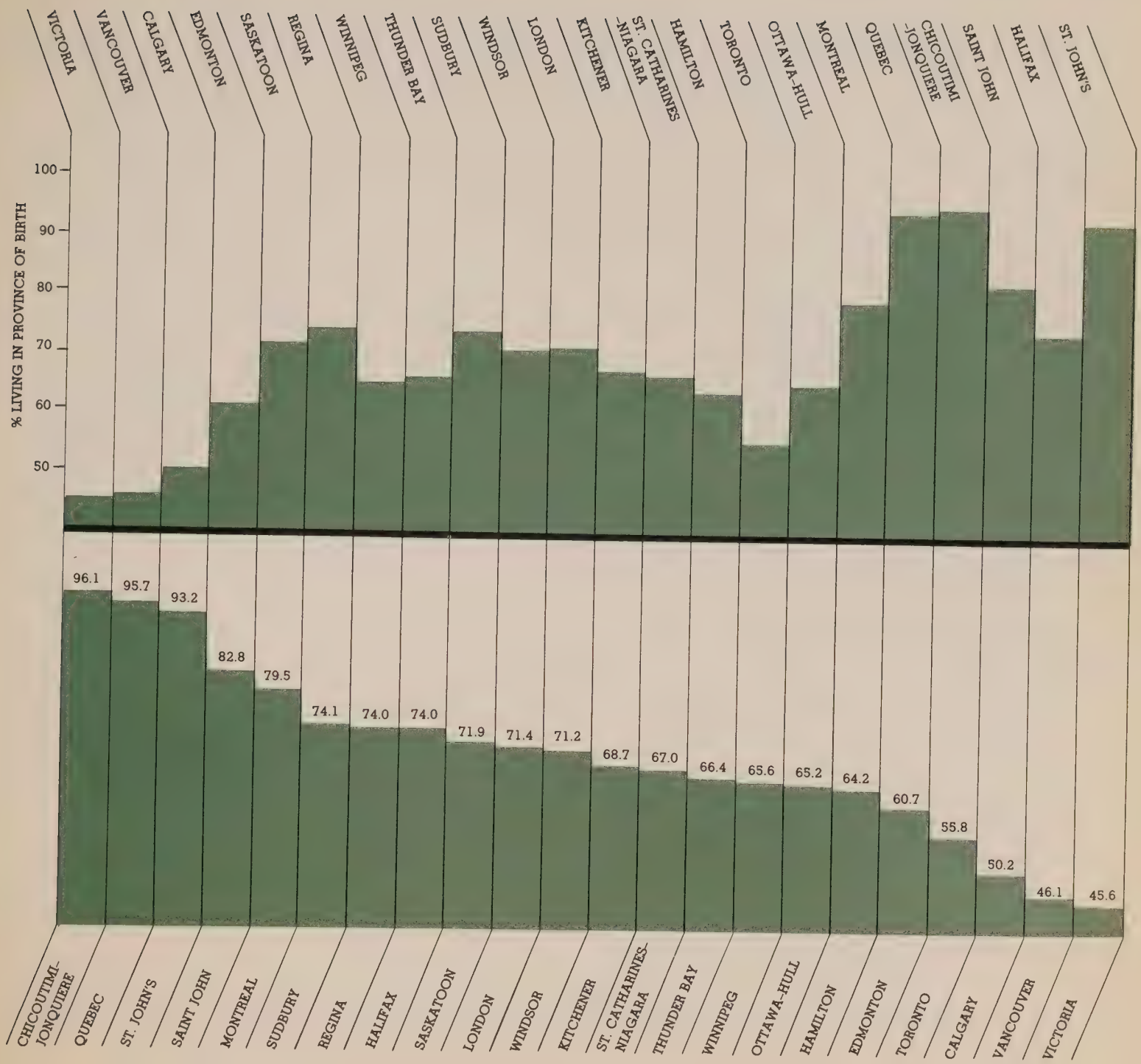
| ASPECT MEASURED | The indicator reflects the degree of cultural homogeneity within a city. Thus it measures the extent to which residents share a common heritage. |
| CONSIDERATION OF THE MEASURE | 1. AREA COVERAGE<br>The data come directly from census figures which are broken down by specific country or province of birth. Data can be disaggregated for males and females, and are available at the levels of census tracts, census agglomerations, municipalities, census divisions, and provinces, as well as the CMAs presented here.<br>2. TEMPORAL COVERAGE<br>Data are available for census years only.<br>3. OTHER COVERAGE INCOMPATIBILITIES<br>None are immediately apparent<br>4. COLLECTION<br>The data are available from Statistics Canada, 1971 Census of Canada, Catalogue 92–727, 1974. The information was collected on a 33 1/3% sample basis.<br>5. COMPUTATION<br>The computation is a straightforward percentaging of raw figures contained in the Census. |
| OTHER MEASURES | Place of birth is only one way of defining cultural homogeneity. More sophisticated measures could be employed but these would have to be developed through survey research. |

SOURCE:
Statistics Canada, 1971 Census of Canada, Catalogue 92–727, 1974.

# CULTURAL HOMOGENEITY



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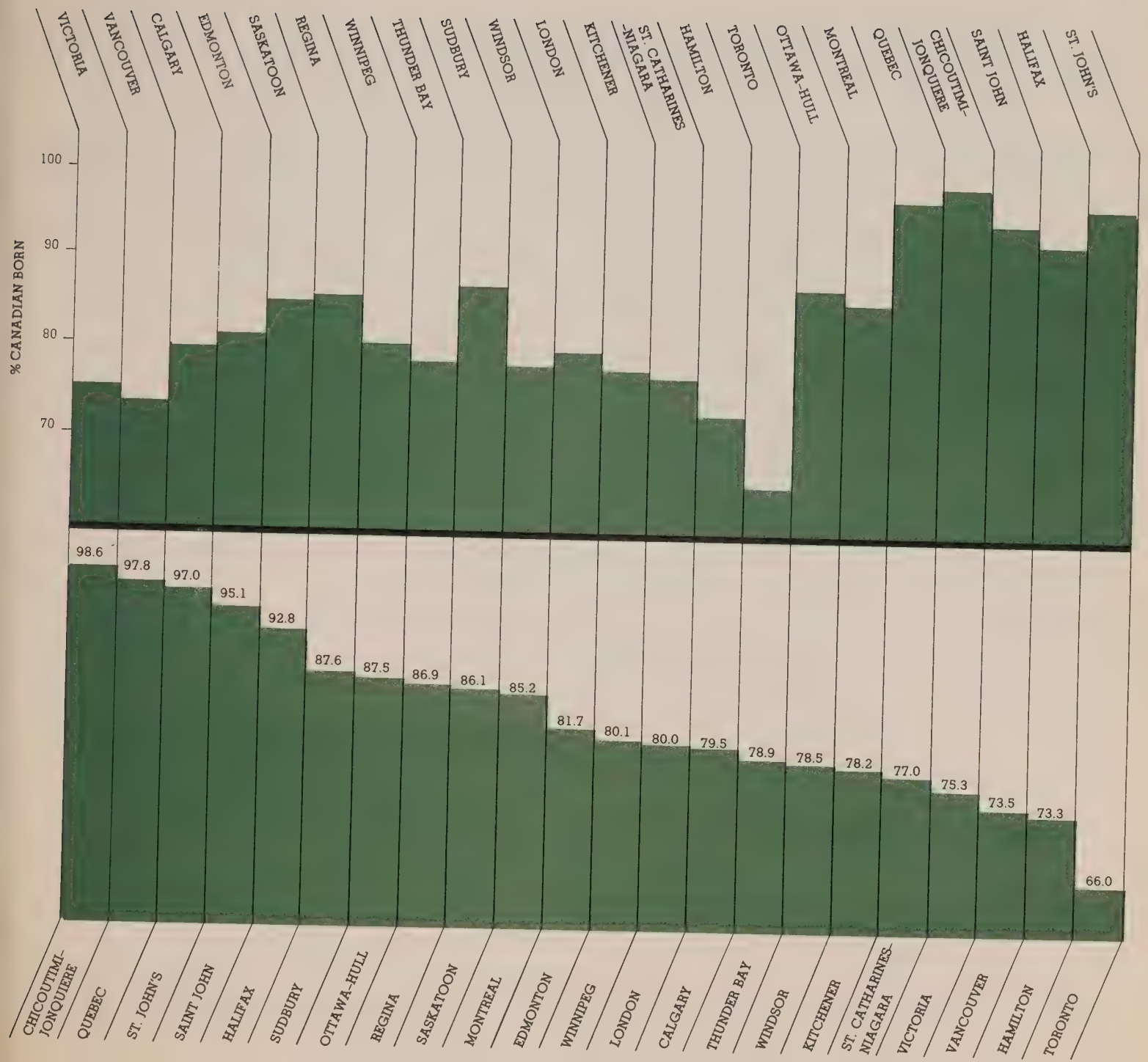
| ASPECT MEASURED | Ethnic origin, as measured by place of birth, measures the number of first-generation immigrants living in each city. It is these people who will reflect most strongly their original culture and who will still be making the greatest adjustment to Canadian society. |
| CONSIDERATION OF THE MEASURE | 1. AREA COVERAGE<br>The date come directly from Census figures which are broken down by specific country or province of birth. Data can be disaggregated for males and females, and are available at the levels of census tracts, census agglomerations, municipalites, census divisions, and provinces, as well as the CMAs presented here.<br>2. TEMPORAL COVERAGE<br>Data are available for census years only.<br>3. OTHER COVERAGE INCOMPATIBILITIES<br>None are immediately apparent.<br>4. COLLECTION<br>The data are available from Statistics Canada, 1971 Census of Canada, Catalogue 92–727, 1974. The information was collected on a 33 1/3% sample basis.<br>5. COMPUTATION<br>The computation is a straightforward percentaging of raw figures contained in the Census. |
| OTHER MEASURES | Place of birth is perhaps the most stringent way of identifying ethnic groups. "Language spoken at home," also in the Census, will include all immigrants who still reflect, in their language at least, their ethnic background. Ethnicity as defined on the basis of "country of origin of ancestors," (Census) is the loosest way of defining ethnic origin, since it includes people whose families have been in Canada for several generations. |

SOURCE:
Statistics Canada, 1971 Census of Canada, Catalogue 92–727, 1974.

# ETHNIC ORIGIN



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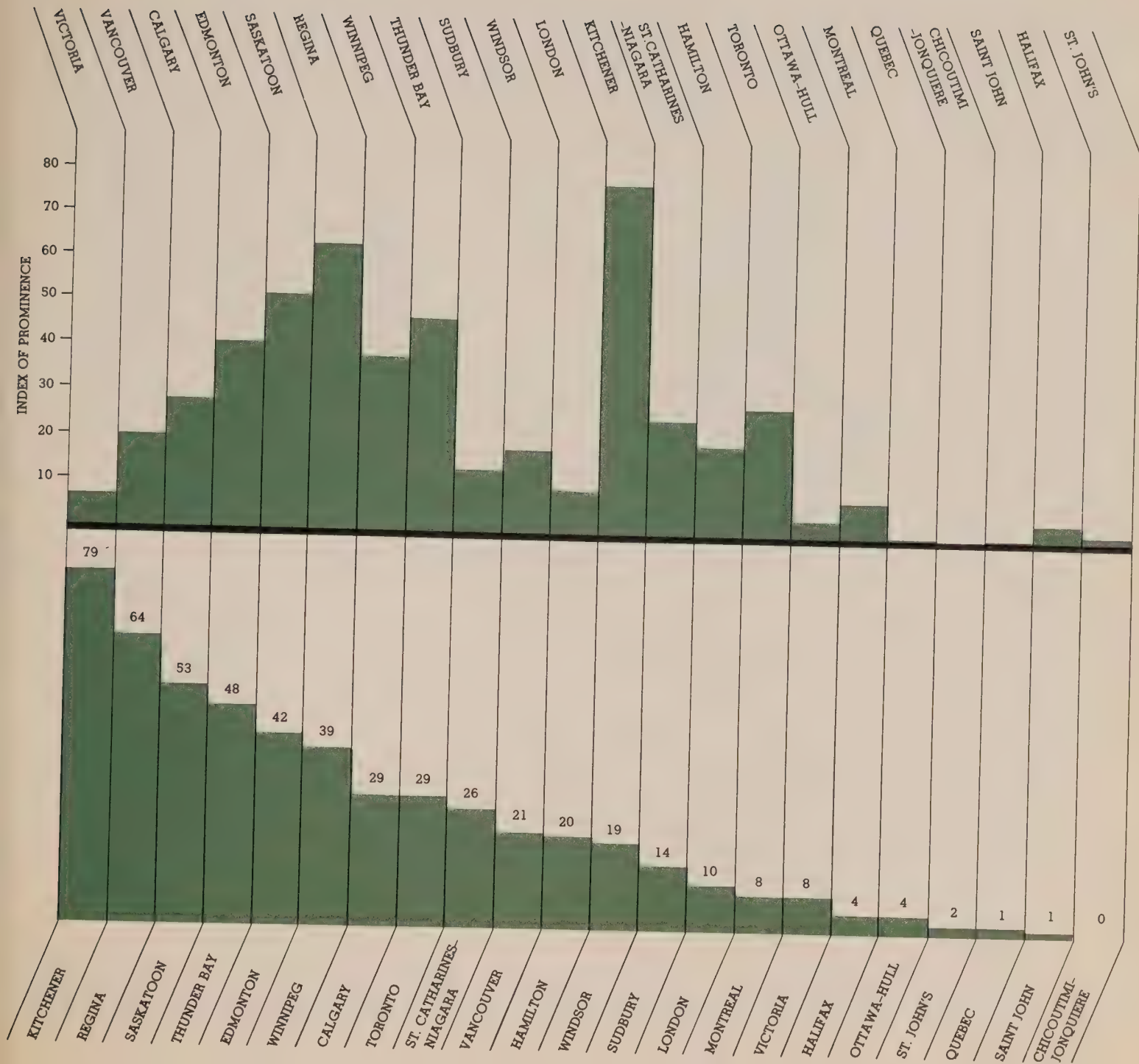
| ASPECT MEASURED | The index measures the degree to which a dominant proportion of the population of a city is made up of persons of non-English or non-French origin. It reflects the extent to which cultural heterogeneity exists in a city. | |
| CONSIDERATION OF THE MEASURE | 1. AREA COVERAGE<br>Data exist for all 22 CMAs as well as provinces, census divisions, cities or towns, other municipal subdivisions, census agglomerations and census tracts. They can be broken down for males and females.<br>2. TEMPORAL COVERAGE<br>Data are available for census years only.<br>3. OTHER COVERAGE INCOMPATIBILITIES<br>"Ethnic group" is determined by response to the question "To what ethnic or cultural group did you or your ancestor (on the male side) belong on coming to this continent?" This may have been several generations in the past, so the extent to which people who are recorded here as members of an ethnic group consider themselves members of that group may vary.<br>4. COLLECTION<br>The data from which the computation was made are available from Statistics Canada, 1971 Census of Canada, Catalogue 92-723, 1973. | 5. COMPUTATION<br>The index is defined as $\Sigma p_i^{\ 2}$ when $p_i$ is the proportion of the population represented by the $i^{th}$ ethnic group. Because the proportion is squared, a few large ethnic groups will result in a higher index than many smaller groups. The index consequently emphasizes ethnic domination rather than variety. |
| OTHER MEASURES | "Ethnic origin" as defined by the Census (see above) includes all those who consider their male ancestor to be non-English or non-French. Other definitions of ethnicity can be based on language spoken at home or birthplace, and will include only more recent immigrants. | |

SOURCE:
Statistics Canada, 1971 Census of Canada, Catalogue 92-723. 1973.

*The index of ethnic prominence reflects the extent to which cultural heterogeneity exists in a city. In other words it measures the extent to which non-English and non-French ethnic groups represent significant proportions of the CMA population. Theoretically the index can range from 0 to 10,000 although here the range is from 0 to 79.

SOCIAL DEVELOPMENT # 12

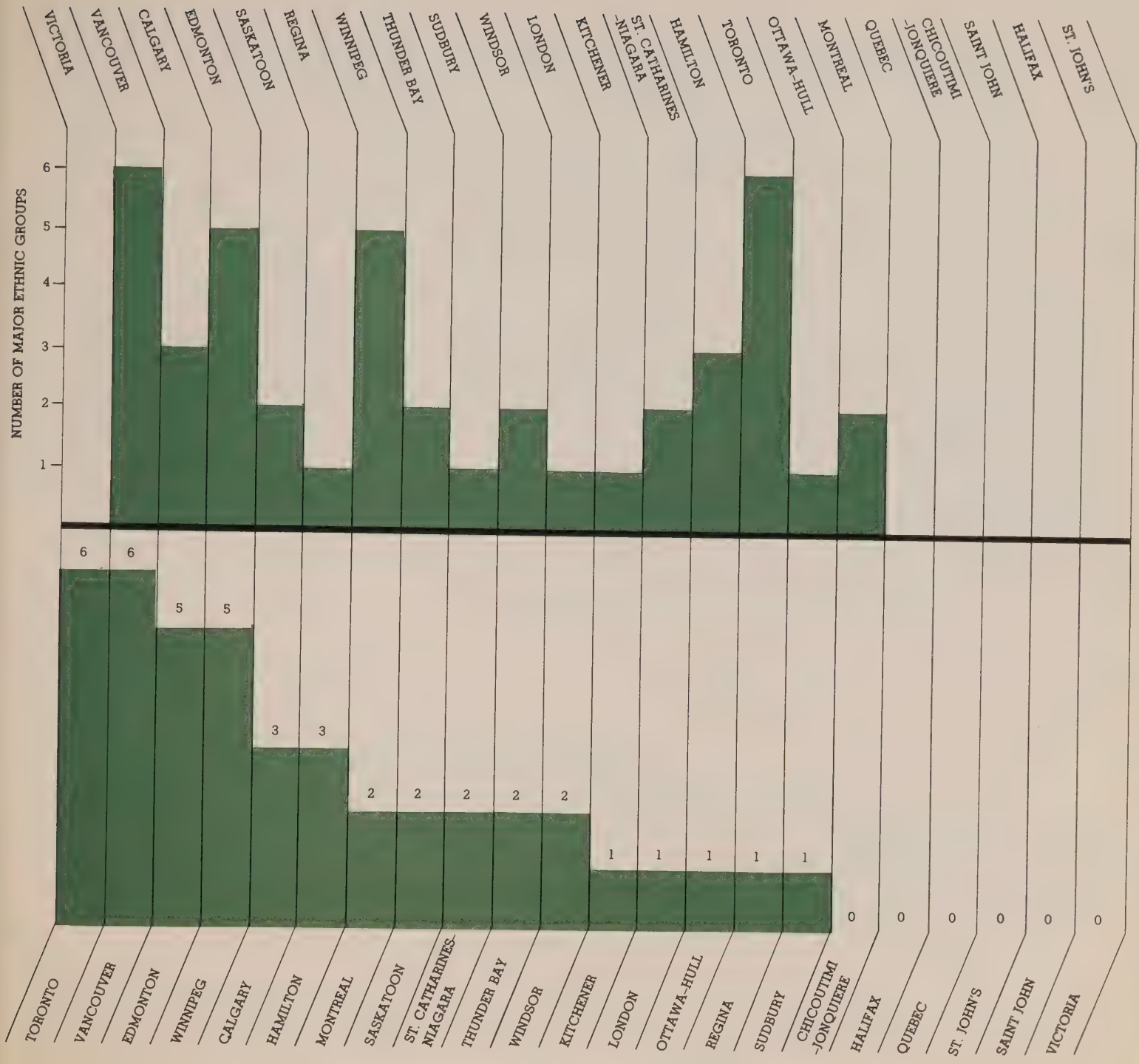
# FOREIGN ORIGIN*



| | | |
|---|---|---|
| ASPECT MEASURED | The index reflects the extent to which cultural heterogeneity exists in a city and gives an indication of how many ethnic groups have a significantly large membership. | |
| CONSIDERATION OF THE MEASURE | 1. AREA COVERAGE<br>Data exist for all 22 CMAs as well as provinces, census divisions, cities or towns, other municipal subdivisions, census agglomerations and census tracts. They can be broken down for males and females.<br>2. TEMPORAL COVERAGE<br>Data are available for census years only.<br>3. OTHER COVERAGE INCOMPATIBILITIES<br>"Ethnic group" is determined by response to the question "To what ethnic or cultural group did you or your ancestor (on the male side) belong on coming to this continent?" This may have been several generations in the past, so the extent to which people recorded here as being members of an ethnic group consider themselves members of that group may vary.<br>4. COLLECTION<br>The data from which the computation was made are available from Statistics Canada, 1971 Census of Canada, Catalogue 92–723, 1973.<br>5. COMPUTATION<br>A "major ethnic group" is one which comprises a significant proportion of the population. For these purposes, a "significant proportion" varies between 2% of the | population of the largest cities and 10% of the population of the smallest along a sliding scale. This sliding scale reflects differences between cities in the absolute number of any one group which would result in that group's having a recognizable impact on the community.<br>Thus an ethnic group comprising 2% of the population of Toronto (over 50,000 people in 1971) would, in our estimation, have a significant impact on the cultural life of that city. On the other hand, in Thunder Bay, it may require 10,000 people of the same ethnic background (approximately 10% of the population) before a comparable impact is felt. The sliding scale attempts to reflect this. |
| OTHER MEASURES | "Ethnic origin" as defined by the Census (see above) includes all those who consider their male ancestor to be non-English or non-French. Other definitions of ethnicity can be based on language spoken at home or birthplace, and will include only more recent immigrants. | |

SOURCE:
Statistics Canada, 1971 Census of Canada, Catalogue 92–723, 1973.
*A major ethnic group is one which comprises a substantial enough proportion of the CMA population to allow the group to retain a significant cultural presence.

# NUMBER OF ETHNIC GROUPS*



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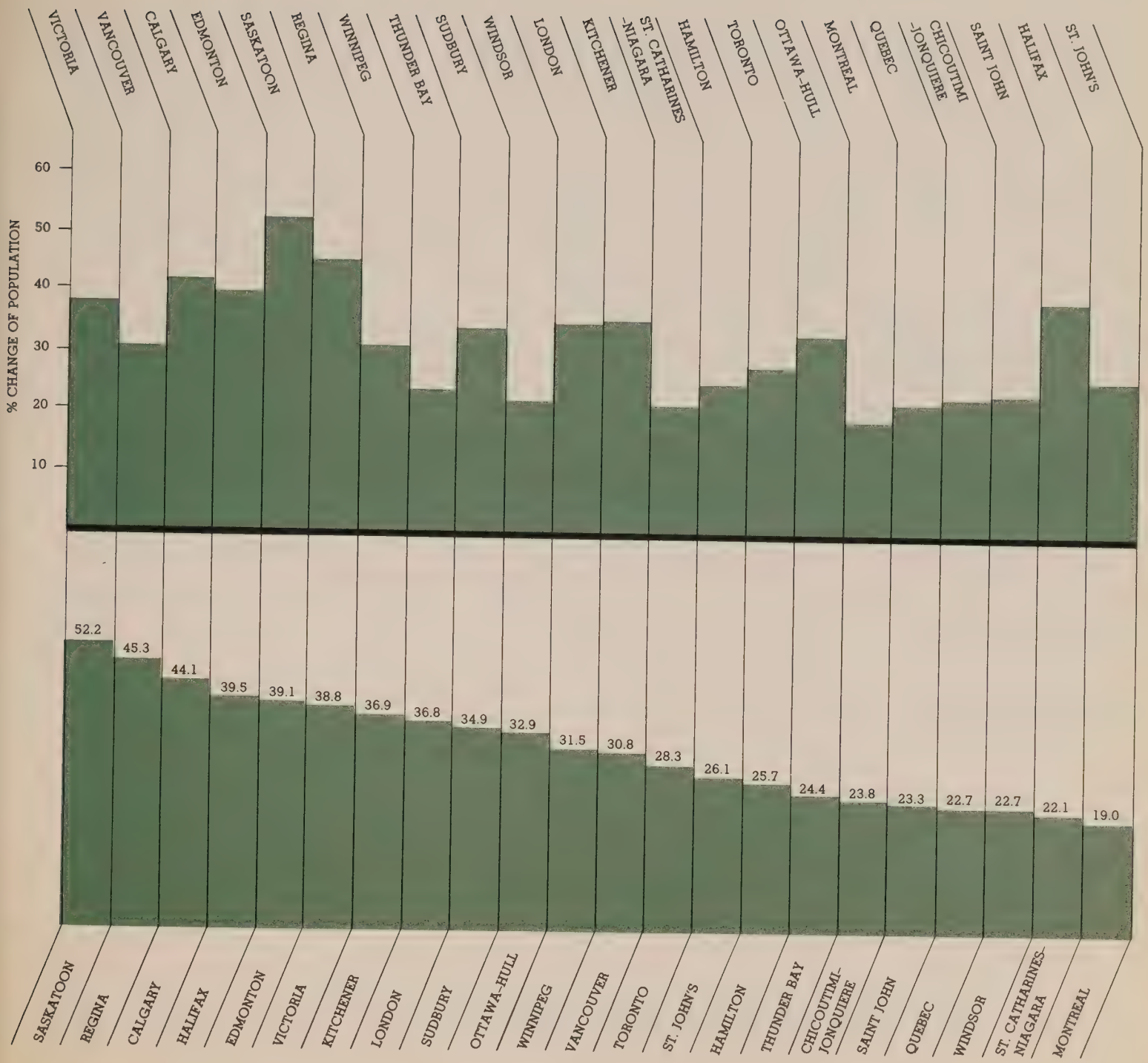
|---|---|---|
| ASPECT MEASURED | The gross migration ratio is a measure of the extent to which there is a flow of migrants to and from each CMA. It reflects the extent to which social relationships are made and broken as a result of moving, and says something about overall population stability in a city. It is possible, for example, that a city whose total population has remained stable over a five-year period has experienced a greater level of population turnover than one which has grown substantially in total population. Lack of growth is not therefore synonymous with stability of social relationships. |
| CONSIDERATION OF THE MEASURE | 1. AREA COVERAGE<br>The data are published by Statistics Canada at the CMA level only.<br>2. TEMPORAL COVERAGE<br>Migration data are collected for census years only.<br>3. OTHER COVERAGE INCOMPATIBILITIES<br>It is possible that the same people may have moved in and out of the CMA several times over the five-year period.<br>4. COLLECTION<br>The data are available from Statistics Canada, 1971, Census of Canada, Catalogue 92–746, 1974.<br>5. COMPUTATION<br>The ratio is computed as follows:<br>$\frac{\text{in-migrants + out-migrants, 1966–71} \times 100}{\text{Total population, 1971}}$ | |
| OTHER MEASURES | None are immediately evident. Although survey sampling could provide estimates of the impact on mobility on social relationships, the costs and efforts involved may not be justified by the value of the findings for policy purposes. | |

SOURCE:
Statistics Canada, 1971 Census of Canada, Catalogue 92–746, 1974.

# POPULATION TURNOVER



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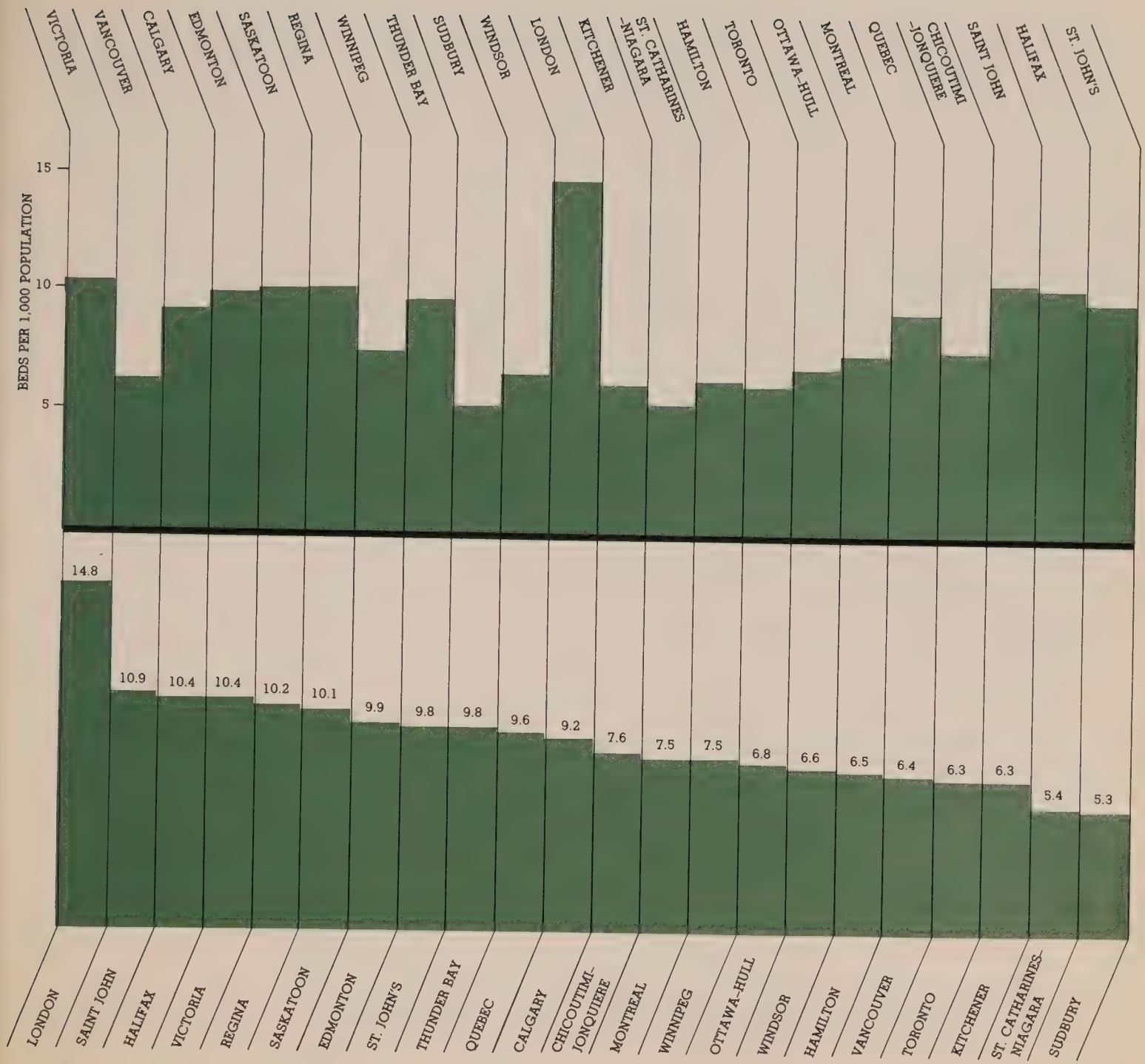
|---|---|---|
| ASPECT MEASURED | Number of beds is an overall measure of the availability of hospital care to the population of each CMA. Facilities in general and allied special hospitals which provide basic care (pediatric, rehabilitation, extended care and others) are reported. The ratio of beds to population should indicate the ease of obtaining a bed in a hospital. | |
| CONSIDERATION OF THE MEASURE | 1. AREA COVERAGE<br>Data are compiled at the CMA level by Statistics Canada. Listings for individual hospitals across the country are also available.<br>2. TEMPORAL COVERAGE<br>A listing of Canadian hospitals is published annually. Subsequently, CMA data are compiled but not published.<br>3. OTHER COVERAGE INCOMPATIBILITIES<br>While all hospitals included in the measure are general or allied special hospitals, varying portions of such hospitals may be devoted to special facilities, such as psychiatric or tuberculosis units, rather than to general care facilities.<br>While hospitals generally serve the metropolitan areas in which they are located, "catchment areas" may be considerably larger for hospitals providing services for surrounding rural areas.<br>The rated bed capacity is usually slightly larger than the actual number of beds. | 4. COLLECTION<br>Data are compiled by Statistics Canada on the basis of reports by individual hospitals, with the cooperation of provincial hospital and welfare authorities. A list of hospitals and facilities is published annually in Catalogue 83–201 and unpublished compilations are made by the Hospitals Section of the Health Division of Statistics Canada.<br>5. COMPUTATION<br>Data are taken directly from Statistics Canada figures. |
| OTHER MEASURES | A better measure than hospital beds of availability of facilities would be the average waiting period for elective or non-emergency surgery. To our knowledge, comparable data for this do not exist. Data on hospital expenditures and detailed specifications of facilities and personnel are available, and similar information is collected for mental institutions, but these data suffer from the same drawbacks, as data on number of hospital beds. All are input measures which may not equate directly to the health of individuals, the ultimate output measure.<br>Specific measures of the level of individual health, while highly desirable, either do not exist at all or show few between-cities differences. Mortality rates are often considered a broad surrogate for health level and these are available. However, only minor variations in mortality rates are observable between metropolitan areas. Nutrition data were also considered, but the sample sizes were inadequate for drawing comparisons between metropolitan areas. | |

SOURCE:
Unpublished Data, Hospitals Section, Health Division, Statistics Canada.

# HOSPITAL BEDS



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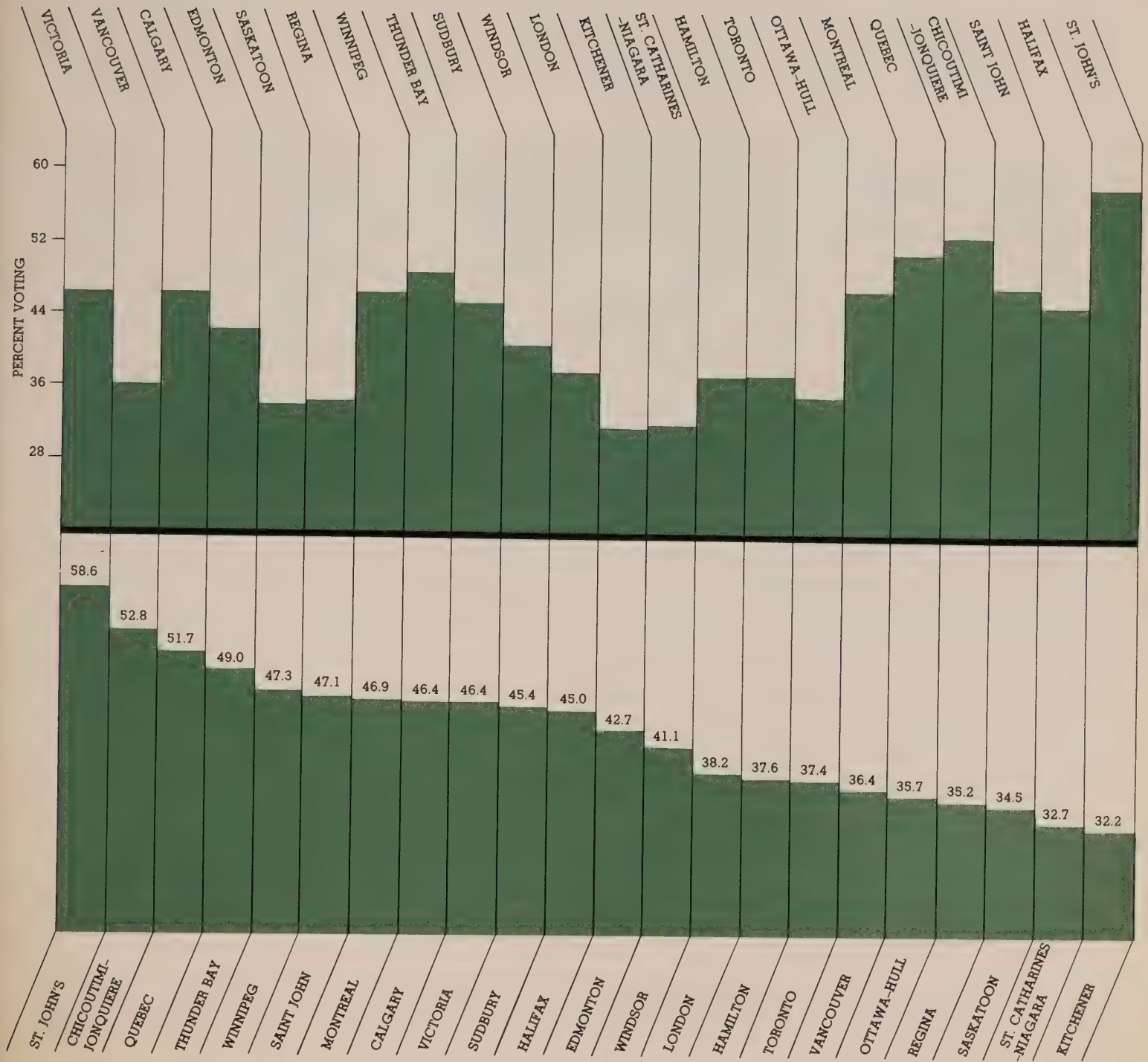
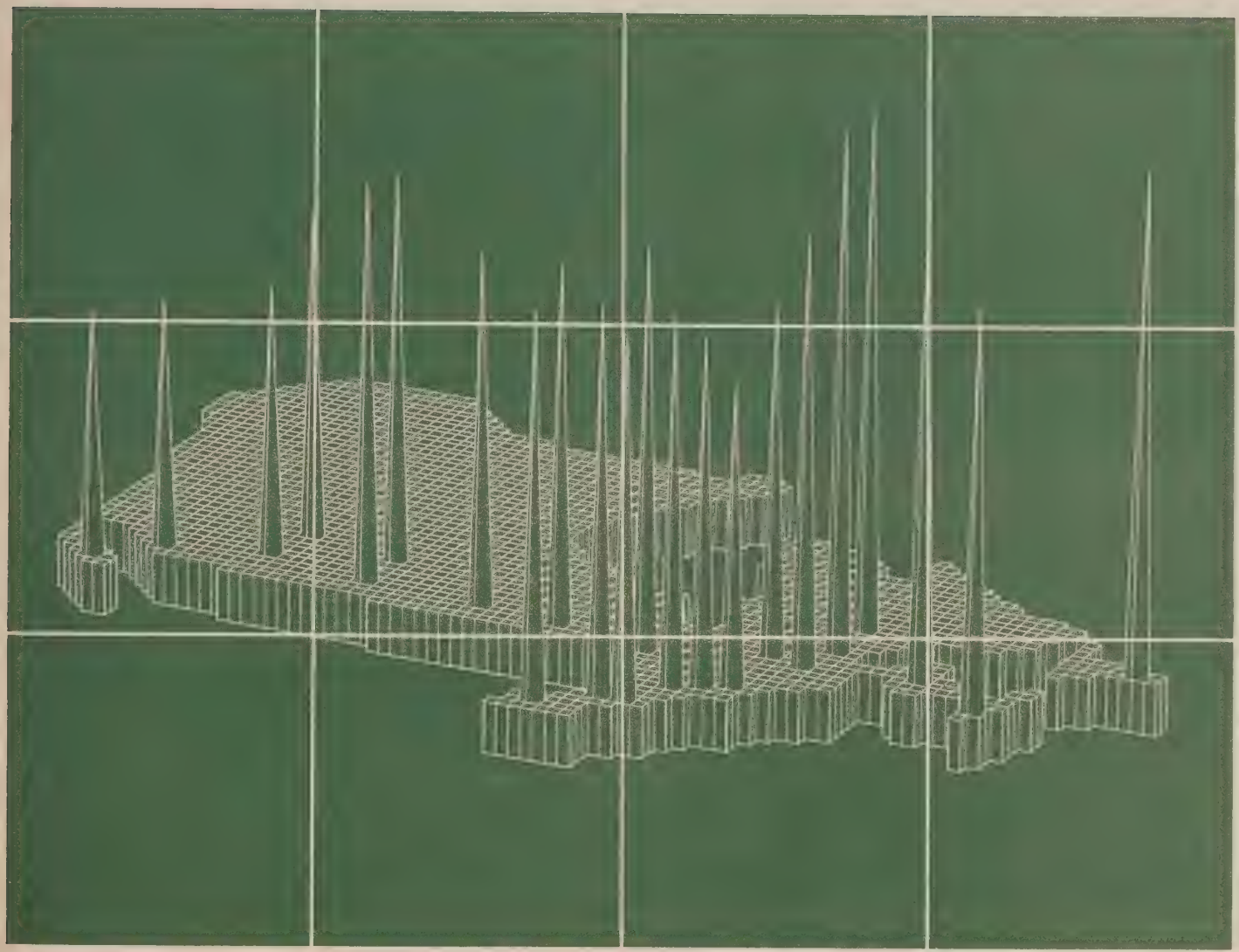
|---|---|---|
| ASPECT MEASURED | Voter turnout is one measure of the state of civic participation. The exercising of one's franchise represents the level of interest in the government of the community in question, the perceived ability to determine the philosophy of government and the perceived opportunity to influence the competence of the process.<br>While a gross measure of participation, voter turnout does reflect the electorate's overall opinions of the momentousness of decisions and the power to affect these decisions. It is interesting to note that, on the average, federal and provincial elections produce about twice the voter turnout that municipal elections do. |
| CONSIDERATION OF THE MEASURE | 1. AREA COVERAGE<br>The area coverage includes the central cities of CMAs. Thus, the coverage of population varies from a relatively small proportion of the CMA (i.e., Toronto), to the total CMA (i.e., Calgary).<br>2. TEMPORAL COVERAGE<br>The coverage averages turnouts at municipal elections since 1969 which includes the years 1969 to 1974. For 8 cities there have been two elections and for 14 cities 3 elections. Date of elections varies as does the length of term in office.<br>3. OTHER COVERAGE INCOMPATIBILITIES<br>In the past, elections in a few cities were alternatively for the mayor and part of the council one time and the remaining councillors the next. Accordingly, interest in elections reflects typical perceptions of the importance of the offices at stake. This has become less of a problem recently with the trend away from overlapping terms of office.<br>Another problem is that some cities include expenditure referenda along with the general election for office. A higher turnout would be expected where this is the case, other things being equal. Variation in the criteria of voter eligibility may also affect turnout rates; for example: where tenants are underrepresented on the rolls, turnout rates may be higher as property owners are more likely to exercise their franchise.<br>4. COLLECTION<br>The prime source of date is a survey by the Institute for Local Government, Queen's University. This data was updated in most instances and newly gathered in a few cases by telephone contact with city clerk's offices (or their equivalent) in the major cities of each CMA. The data used here could readily be updated by means of an expanded and more regular survey on the part of the Institute, or simply through telephone contact.<br>5. COMPUTATION<br>The percentage was computed by taking the total number of votes cast in the two or three elections since 1969 as a percentage of the total number of eligible voters in the same elections. |
| OTHER MEASURES | Voter turnout is not necessarily the best measure of citizen involvement in public affairs. Undoubtedly, one would wish for a broader concept, one that would weigh public participation at all levels of government. However, there is no consistent, comparable inter-urban data, although one would expect that students of politics would have long ago sought such information. Nor does it seem that any consensus exists on what constitutes a good measure of involvement.<br>Off the cuff, it seems that several measures could be used to calculate the intensity of involvement: metropolitan membership in federal parties; metropolitan membership in provincial parties; membership in community organizations; role of legitimate community organizations in the community as represented by the number and range of issues raised and dealt with. These do not exhaust the list but only suggest some way of obtaining a more basic measure of participation.<br>SOURCE:<br>Unpublished survey data from the Institute for Local Government, Queen's University, Kingston and telephone calls to city clerks' offices. |

# VOTER TURNOUT



# ECONOMIC DEVELOPMENT

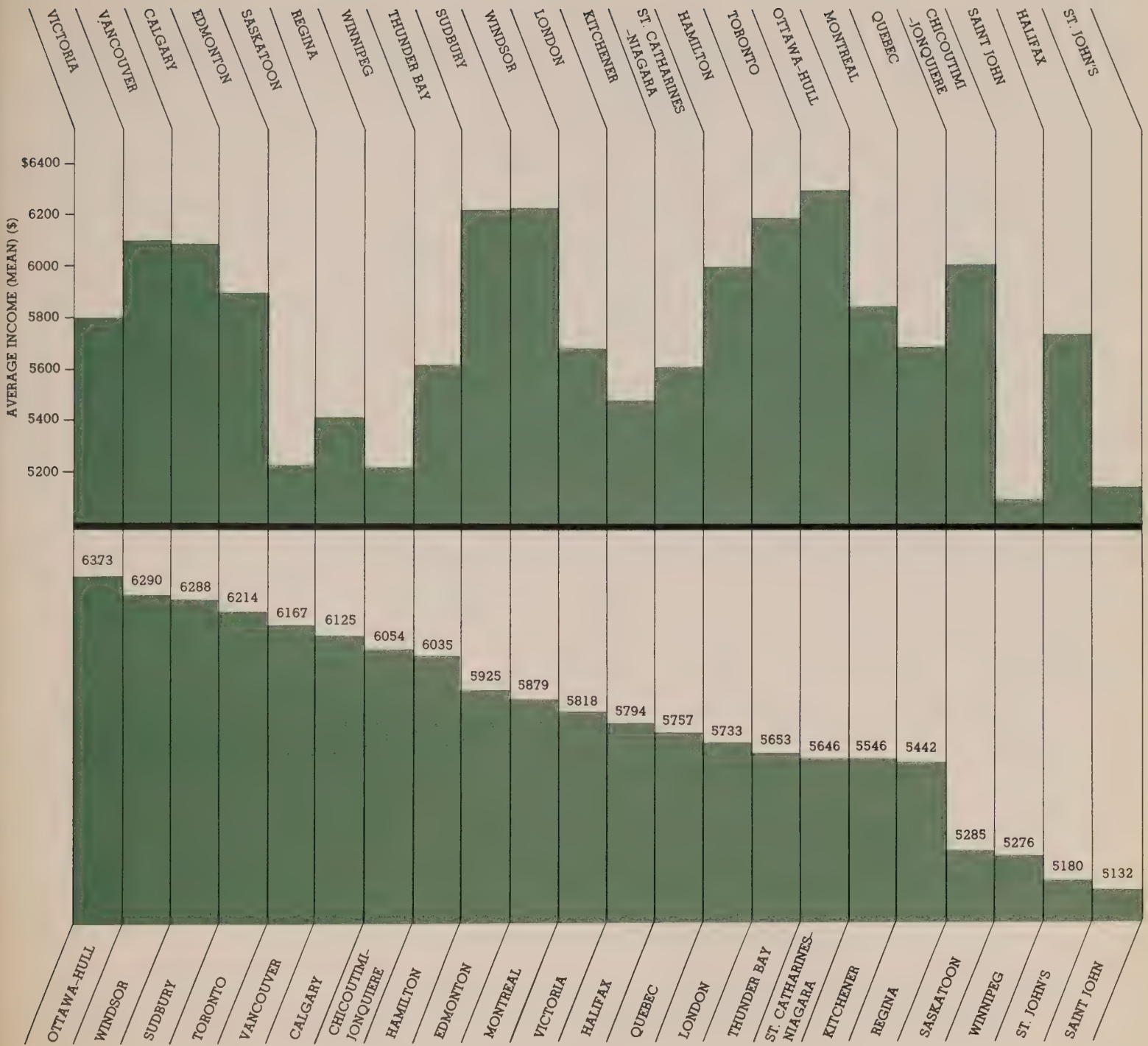


| | | |
|---|---|---|
| ASPECT MEASURED | Average income after federal taxes is a measure of economic well-being. Adjusting for taxes gives a better measure of command | over private sector goods and services, because of variations in marginal rates of taxation. |
| CONSIDERATION OF THE MEASURE | 1. AREA COVERAGE<br>National revenue data are not necessarily reported on a CMA basis. We do not now know what the spatial bias is. Individuals living outside a metropolitan area could file their tax returns from an accountant's office in the metropolitan area or vice versa.<br>2. TEMPORAL COVERAGE<br>The data are reported on an annual basis, and are published within 2 years of the end of the tax year.<br>3. OTHER COVERAGE INCOMPATIBILITIES<br>Regional variations in the number of non-filers may cause a problem. It is possible that in some metropolitan areas the figures should be adjusted downward to reflect higher non-filer rates.<br>Moreover, in certain metropolitan areas salary or wage income contributes a higher proportion to the overall income, and it is well known that this income is typically fully | reported. In these cases a downward adjustment would seem in order.<br>4. COLLECTION<br>The data are available from the National Revenue Taxation Statistics, 1973 Edition (Annual).<br>5. COMPUTATION<br>Total federal tax payable for a major metropolitan area is subtracted from total income assessed and divided by the total number of tax filers to give the arithmetic mean of income. In every province with the exception of Quebec, the federal tax payable includes income taxes collected by the federal government for its own purposes and on behalf of the provinces. Quebec collects its own provincial income taxes, and they are not recorded in the National Revenue Taxations Statistics. Accordingly, the taxation statistics have been adjusted upwards to account for the income taxes which Quebec collects directly. |
| OTHER MEASURES | "Average after-tax income" is neither the most complete nor the best measure of disposable income and is only a rough indicator of overall economic well-being.<br>A more appropriate measure overall would be a measure of median income. In turn, this figure should be adjusted for taxes to all levels of government. A further adjustment should then be made for cost of living differentials. In this way, one would have an appropriate comparative-income figure. Considering the available data, we are a long way from computing such a figure. The greatest problem is a lack of comparative price data, excepting certain segments of the housing market. In view of the fact that Statistics Canada does provide a comparative cost-of-living index for foreign capitals where | Canadian embassies are located and for small northern communities in Canada, the unavailability of an index for other urban places is particularly vexing. (The sample of 14 Canadian cities that does exist does not provide the geographical detail required for most analytical purposes and excludes the housing component.)<br>On the tax side, the problems seem less difficult although data on provincial taxes would have to be adjusted to reflect variations in what the taxes pay for (e.g., in some cases additional payments are made for hospital insurance). The same could be the case for municipalities (i.e. water taxes, additional services charges). Even with this information we cannot account for variations in the quality of services. |



SOURCE:
Revenue Canada Taxation Statistics, 1973.

# AVERAGE INCOME (MEAN)



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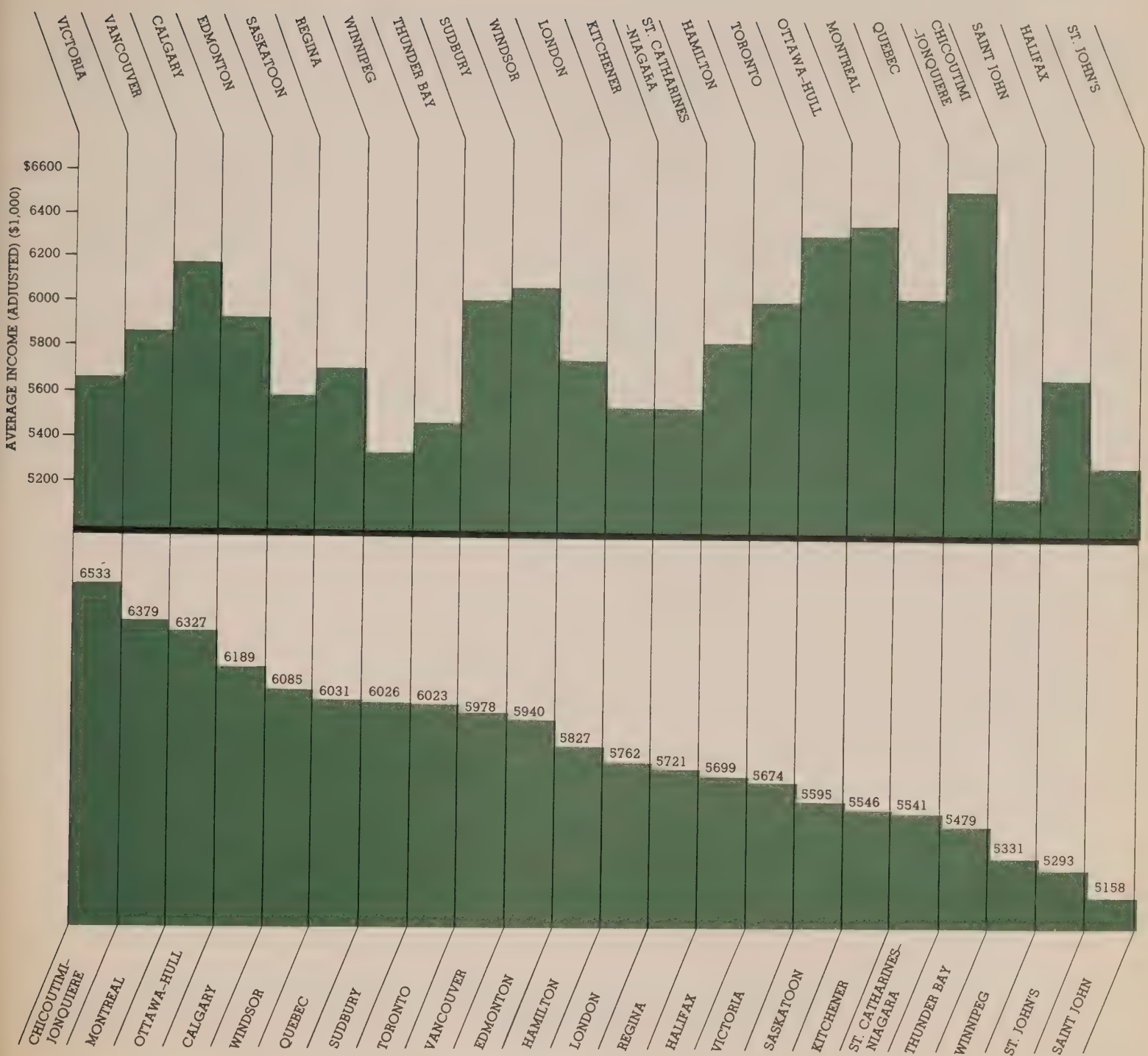
|---|---|
| ASPECT MEASURED | Income adjusted for taxes and housing costs provides a measure of the dollar value of discretionary income earned in each major urban area. Housing costs make up a major proportion of household expenditures (25% to 30%). It is inevitable that the proportion of the family budget set aside for housing varies according to average housing costs in each city. The adjustment to total income reflects this. Federal income tax also takes away a significant portion of gross income, and this varies according to tax bracket. The subtraction of income tax for this indicator reflects this. |
| CONSIDERATION OF THE MEASURE | 1. AREA COVERAGE<br>Revenue Canada data are not reported on a CMA basis. Data on housing costs are available from CMHC for all 22 CMAs.<br>2. TEMPORAL COVERAGE<br>Income data are reported on an annual basis. Data on housing costs are reported annually and available in May for the preceding year.<br>3. OTHER COVERAGE INCOMPATIBILITIES<br>Regional variation in the number of non-filers may cause a problem. Moreover, in certain metropolitan areas salary or wage income contributes a higher proportion to the overall income and it is well known that this income is typically fully reported.<br>The average cost of a single-detached National Housing Act (NHA) house does not necessarily represent the overall average cost of housing. Only low and moderate priced housing are eligible for NHA financing. Thus the average cost reported here is on the low side. Moreover, the quality and size of housing is not taken into account in reporting average cases. An attempt to partially control for this has been made by basing housing costs on the cost of a 1100-square-foot house on an average lot in each of the CMAs.<br>4. COLLECTION<br>The income data are available from the National Revenue Taxation Statistics, 1973 Edition (Annual). It is assumed that the data are thus highly reliable. Housing costs are found in Canadian Housing Statistics 1972, CMHC.<br>5. COMPUTATION<br>Total federal tax payable by all tax payers in a major metropolitan area is subtracted from total income assessed and divided by the total number of tax filers to give the arithmetic mean of income. In every province with the exception of Quebec, the federal tax payable includes income taxes collected by the federal government for its own purposes and on behalf of the provinces. Quebec collects its own provincial income taxes, and they are not recorded in the National Revenue Taxations Statistics. Accordingly, the taxation statistics have been adjusted upwards to account for the income taxes which Quebec collects directly.<br>The after tax income is then adjusted to reflect differential housing costs in each CMA. The differential housing cost is computed for each CMA by multiplying the proportion of income estimated as typically spent on housing (25 percent of pre-tax income) times the housing price index, for which the average housing cost for all CMA's equals 1.00. The difference between this value and the proportion of income typically spent on housing reflects the savings or additional costs which one faces in acquiring a house in a particular CMA. When the after tax income is adjusted by the savings or additional costs, the average income then reflects more closely real discretionary income between the major urban areas. |
| OTHER MEASURES | A more adequate measure of comparative income would be the after-tax disposable income from all sources which in turn would be adjusted for consumer price differences. Again the median would be a preferable measure of income and there should be some measure of the proportion of high and low income families. |

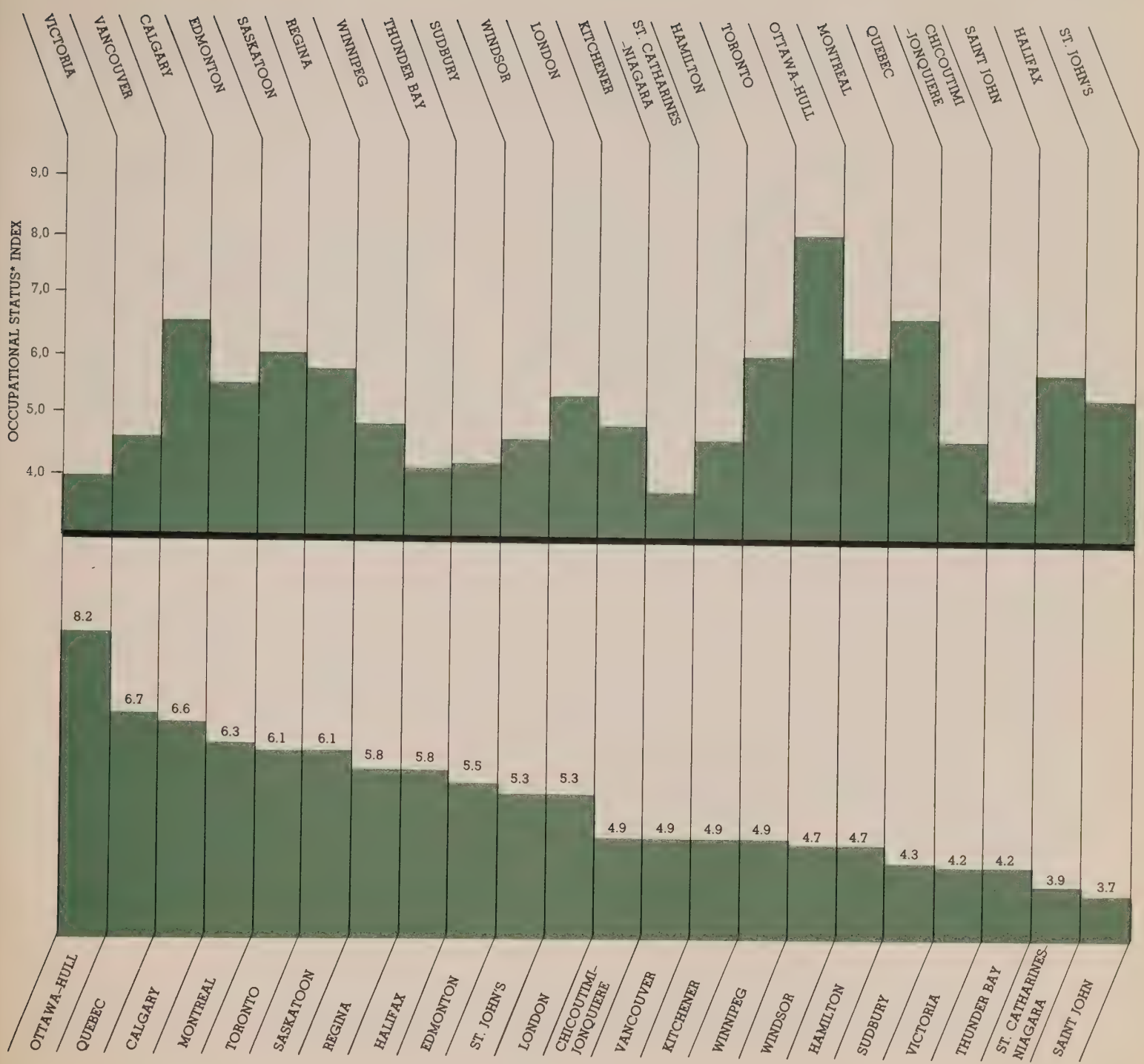
SOURCE:
Revenue Canada Taxation Statistics, 1973, and CMHC Canadian Housing Statistics, 1972.

# AVERAGE INCOME (ADJUSTED)



| | | |
|---|---|---|
| ASPECT MEASURED | The occupational status of metropolitan areas might be seen as the drawing power of that labour market for highly skilled labour. Thus it is a measure of labour market quality, and perhaps of overall dominance, on at least a broad regional level and in many instances at a national or combined national-regional level. In general, then, the measure provides an indicator of attractiveness of a particular metropolitan area for migrants. | |
| CONSIDERATION OF THE MEASURE | 1. AREA COVERAGE<br>Occupational status was computed from 1971 Census data. Comparisons can be had for areal sub-units such as inner city and suburbs or even at a gross neighbourhood level.<br>2. TEMPORAL COVERAGE<br>While baseline data are available only at the time of census taking, Immigration Canada has developed a model for forecasting occupational growth for metropolitan areas. From this a yearly estimate would be possible.<br>3. OTHER COVERAGE<br>INCOMPATIBILITES<br>None are immediately evident.<br>4. COLLECTION<br>The data are available from Statistics Canada, 1971 Census of Canada, Catalogue 94–719.<br>5. COMPUTATION<br>The computation of the Occupational Status measure involves several steps, yet is nontheless straightforward. To begin with, a scale has been developed for assigning a rank from one to ten to an occupation, on the basis of the relative skills, experience and | training required for qualification in that occupation. The scale is based on a massive survey of all occupations in Canada. The rating scheme is provided in the Canadian Classification Dictionary of Occupations. Based on these ratings and the scale, a listing was derived of all occupation groups ranking 8, 9 or 10 (out of a possible ten points). For each metropolitan area the total number of persons with occupations in the top three categories was calculated. This figure was divided by the total number of individuals in the labour force. The occupational index, then, is the proportion of the total labour force in the three highest levels. |
| OTHER MEASURES | Highest occupational status of itself should not be construed as the sole factor in assessing the dynamism of an urban labour market. For those with less "impressive" skills the availability of "blue collar" employment and opportunity for occupational mobility is much more critical. Nevertheless, the dominance of an area in the former respect should have spin-offs throughout the labour market.<br>A more useful indicator would be an occupation index specifically designed to identify the potential for future growth in each occupation. It would identify the key occupations not only in terms of their growth potential but those having the largest multiplier effect on growth in other occupations. This could be used in combination with an industry growth index. | In addition to gross indices, finer breakdowns are required by sex and level of experience, whether new entrant or persons with required or related skills.<br><br>SOURCE:<br>Statistics Canada, 1971 Census of Canada, Catalogue 94–719, 1974.<br>*Occupational Status Index is the percentage of the labour force in the three highest skilled occupational categories.<br>Illustrative of the occupational groups in these three categories are the following professions: lawyers, economists, university teachers, engineers, physical and natural scientists, business executives and physicians and surgeons. |

# OCCUPATIONAL STATUS*



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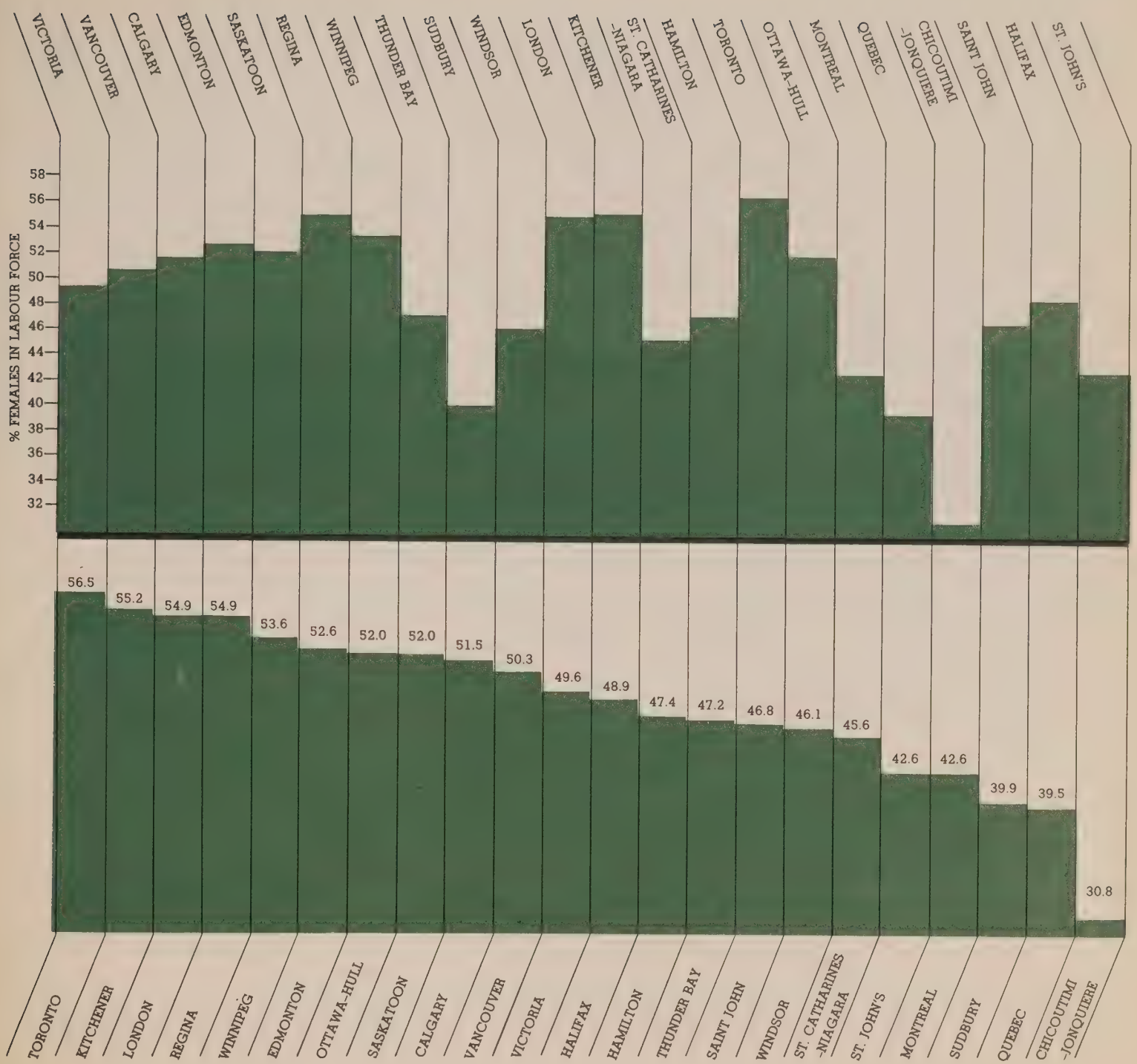
| ASPECT MEASURED | Female labour force participation rates reflect both the availability of job opportunities for women and the extent to which women are taking advantage of these. It is difficult to separate the two factors which jointly | determine the participation rate: the employment market and preferences within the family. |
| CONSIDERATION OF THE MEASURE | 1. AREA COVERAGE<br>The coverage is the CMAs. The data are from the 1971 Census. Areal sub-sampling is possible and thus comparisons of the inner city and the suburbs can be made.<br>2. TEMPORAL COVERAGE<br>The data are only available for census years.<br>3. OTHER COVERAGE<br>INCOMPATIBILITIES<br>None are immediately apparent. | 4. COLLECTION<br>The data are available from Statistics Canada, 1971 Census of Canada, Catalogue 94–706, 1974.<br>5. COMPUTATION<br>No computation is involved. The calculations are as reported in the publication. |
| OTHER MEASURES | A better measure of job opportunity for females would be a measure matching the effective supply against the effective demand. This could only be accomplished through personal surveys of employers and a sample survey of all employable women.<br>Even within the existing data, a finer breakdown of female labour force participation could prove helpful. For | example, a breakdown by variation in the age of female workers would assist to identify those who are re-entering the labour market as opposed to those who have been continuously employed. |

SOURCE:
Statistics Canada, 1971, Census of Canada Catalogue 94–706, 1974.

# FEMALE LABOUR FORCE



| | | |
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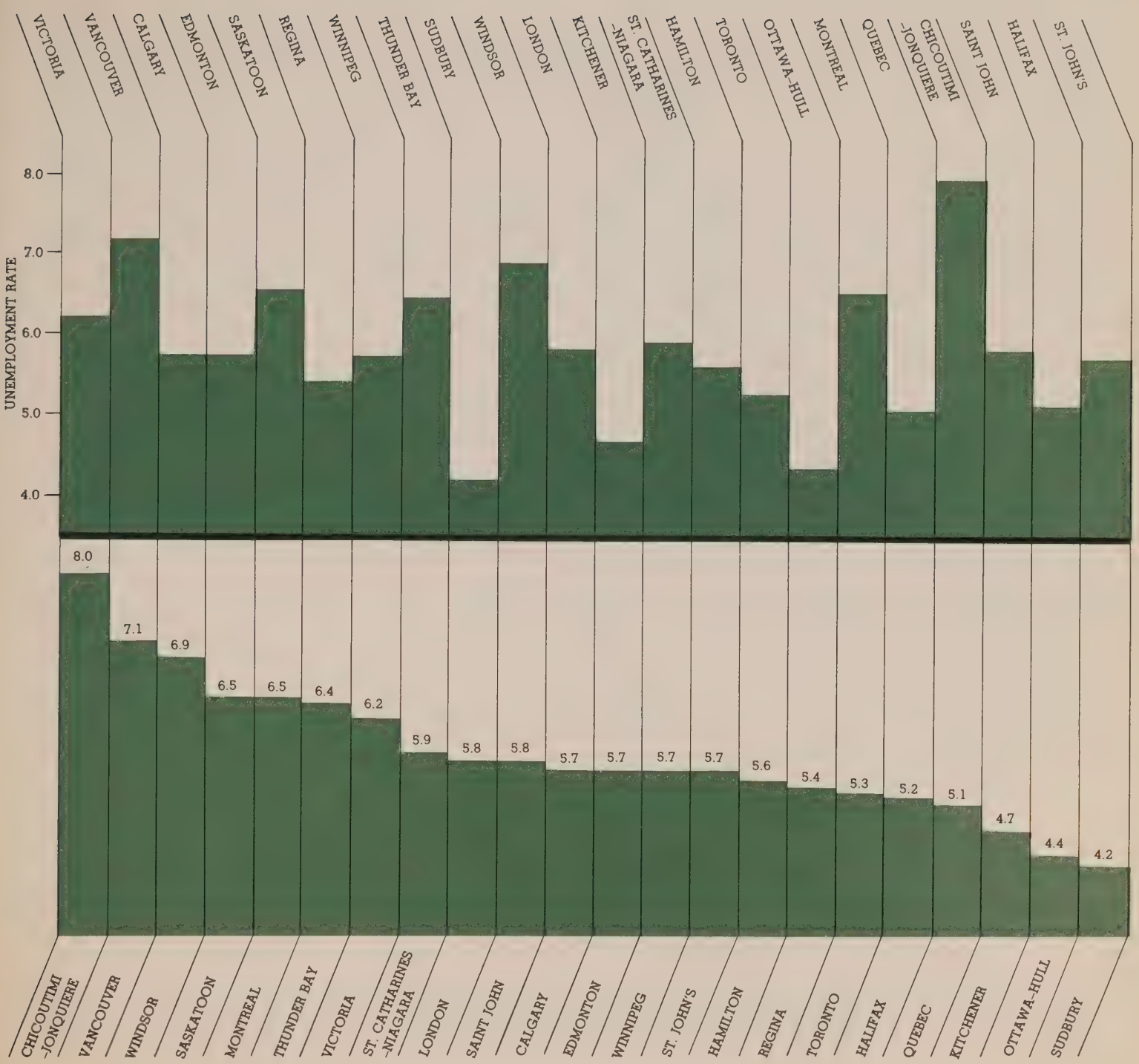
| ASPECT MEASURED | Unemployment rate among the active* labour force measures short-term, cyclical unemployment and is thus a measure of overall employment stability. In general, this type of unemployment accounts for some 80% of all unemployment in urban areas. The | remaining 20% is accounted for by individuals who are new entrants into the labour force or who have no recent experience (i.e., within past 18 months). The proportions are not separated out. |
| CONSIDERATION OF THE MEASURE | 1. AREA COVERAGE<br>Unemployment rates are available from the 1971 Census on a CMA basis. Thus comparisons could be had for areal subunits such as the inner city and suburbs.<br>2. TEMPORAL COVERAGE<br>Data are available only at the time of census taking.<br>3. OTHER COVERAGE INCOMPATIBILITIES<br>None are readily apparent.<br>4. COLLECTION<br>The data are published by Statistics Canada in the 1971 Census of Canada, Catalogue 94–703 1974. More up-to-date data, on a metropolitan basis are unavailable, at least for | all CMAs. The labour Force Survey, which is carried out monthly, does not provide coverage of a sufficient number of CMAs.<br>5. COMPUTATION<br>Unemployment rates among active labour force participants is the total number unemployed, less those with no recent work experience or no experience, as a percentage of the total labour force. |
| OTHER MEASURES | Unemployment rates are gross measures of employment stability. They do not account for differences among short-term cyclical and seasonal unemployment versus longer-run structural unemployment. Moreover they are insensitive to the numbers of persons affected whether a few over a relatively long period or the converse. For instance a short-term widespread unemployment, given the improved Unemployment Insurance Program, is less harmful than long-term unemployment among certain core groups in the labour force.<br>More refined measures would record unemployment rates arising from source | (technological change, shifts in demand for different occupations or adjustments for overproduction) and within occupational groups.<br>However, the reality of the situation is that we lack good current and historical data of gross unemployment rates for urban areas. The data which are published are based on a very small sample, which does not permit estimates for most CMAs. |

SOURCE:
Statistics Canada, 1971 Census of Canada, Catalogue 94–703, 1974.
*Active is defined as having worked within the previous eighteen months. .

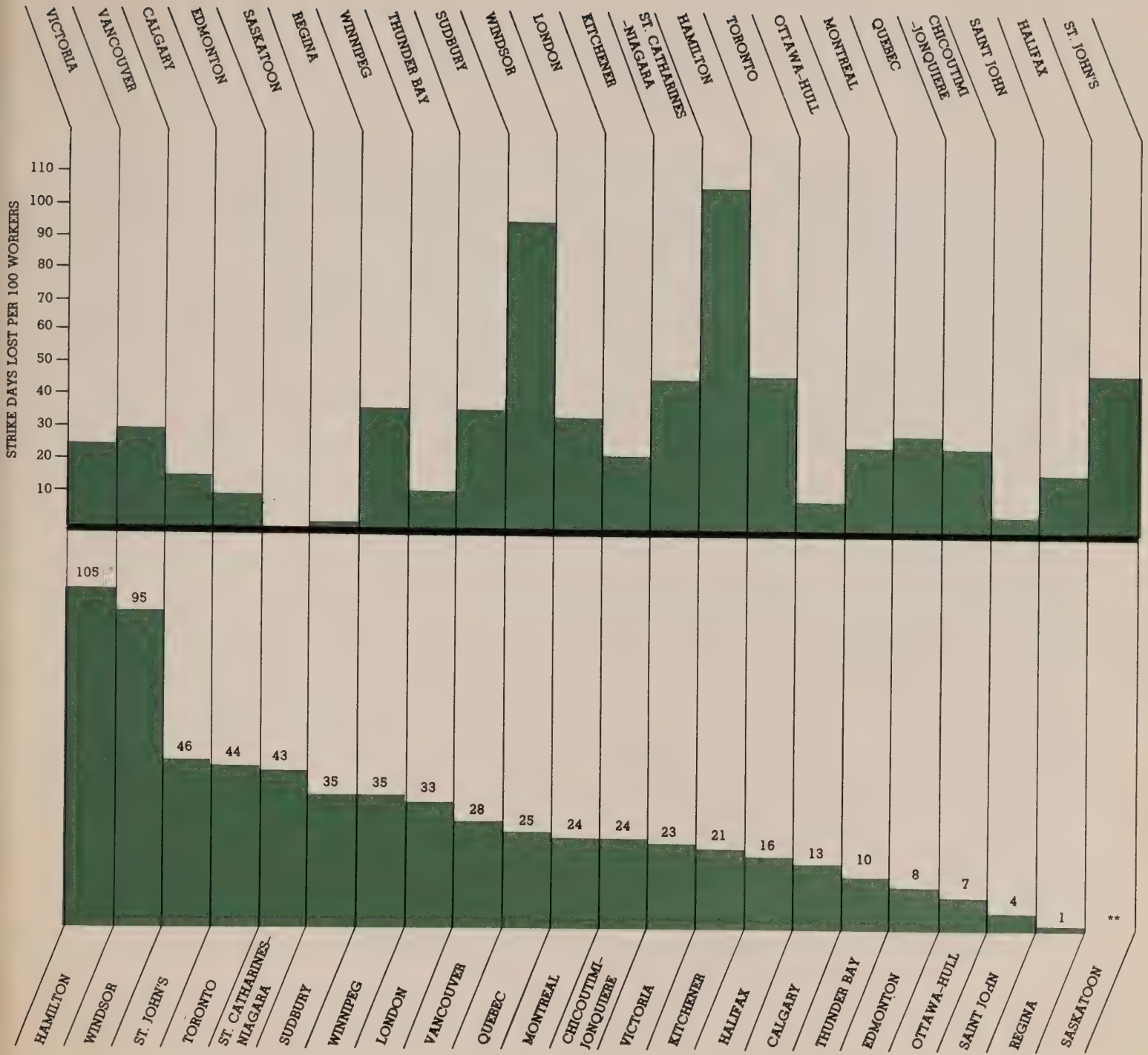
# UNEMPLOYMENT



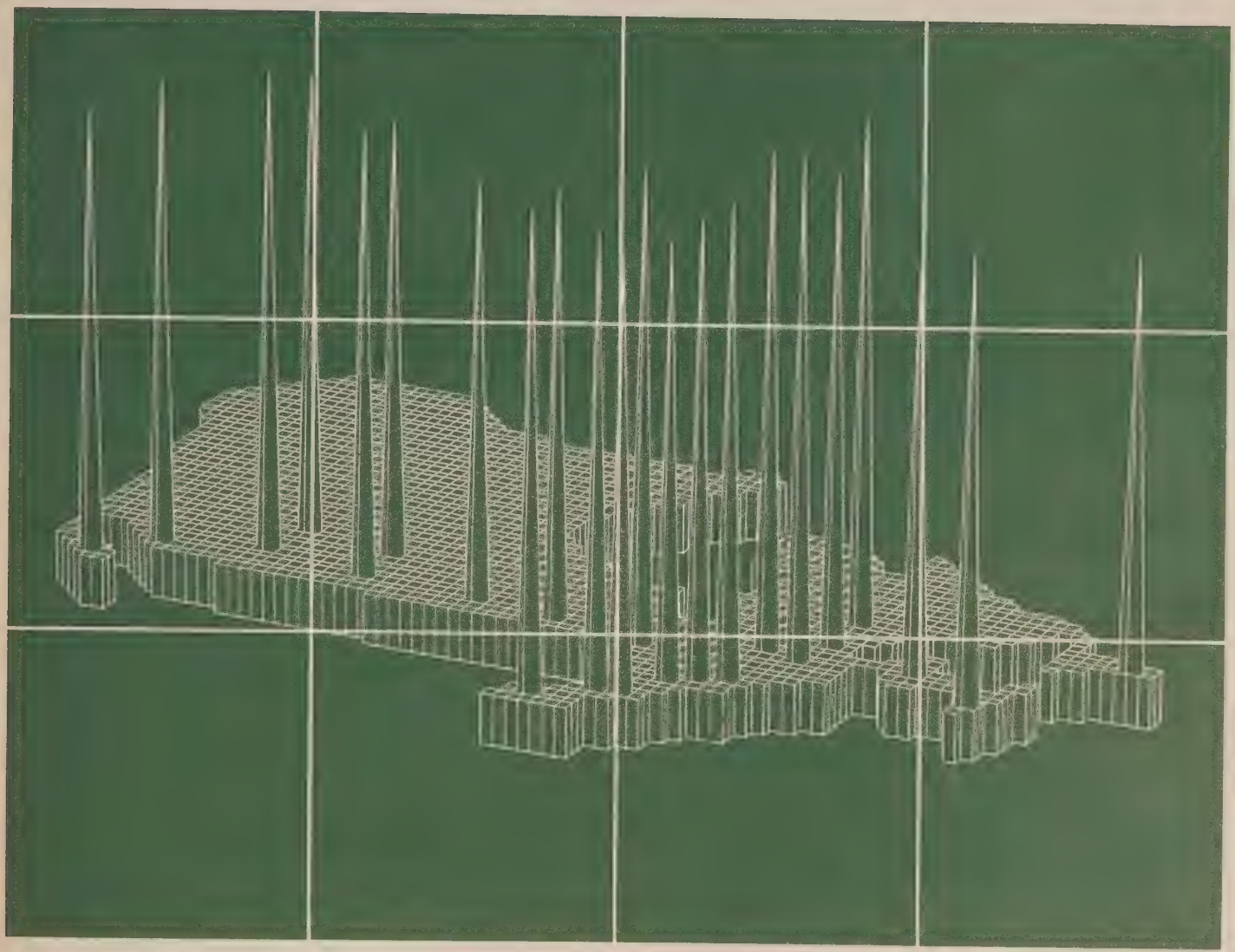
| | | |
|---|---|---|
| ASPECT MEASURED | Strike days lost measure a breakdown in the consensus of the fairness of conditions under which workers labour. It is also a measure of loss of goods or services to the economy. In general, it could be argued that a high level of strikes reflects a high level of job dissatisfaction or job insecurity. Taken to the extreme, the index measures social breakdown. | |
| CONSIDERATION OF THE MEASURE | 1. AREA COVERAGE<br>The data are compiled from unpublished lists of strike days lost by firm, by industry sector and by municipal location. The locations can be aggregated readily to the CMA level (approximated).<br>2. TEMPORAL COVERAGE<br>Data are collected routinely and compiled on a calendar year basis. However, printouts of strikes on a municipal and industry-sector basis are available only after a year or eighteen-month lag. This need not be the case. Labour force size data are taken from the 1971 Census, Catalogue 94–705, 1974.<br>3. OTHER COVERAGE INCOMPATIBILITIES<br>Two problems are particularly vexing with the data. The first is that industry-wide strikes, such as a strike of elevator installers, are recorded for a region as a whole (e.g., Ontario) and not for specific municipalities. In these instances one can only estimate the days lost in any one municipality. Second, rotating strikes are not allocated to specific communities, nor is the record of loss necessarily accurate due to the short-term nature of the work stoppage. | 4. COLLECTION<br>The data are collected by local offices of Labour Canada and forwarded to headquarters in Ottawa. We do not know how consistent and accurate this type of reporting is. Much depends on the motivation of local staff and the way the information relates to their overall job duties.<br>5. COMPUTATION<br>The computation is a straightforward average of strike days lost per 100 persons in the labour force. The labour force figure must be estimated between census years. |
| OTHER MEASURES | The number of strike days lost does not give a full understanding of the impact of strikes. It tells little of the overall economic consequences, such as layoffs occasioned in other industries, or of actual production loss. Nor are the number of strikers involved cited. Does the strike involve few people over a long period or the converse?<br>Moreover, the outcome of the strike is not known. Furthermore, strikes can result in improved working conditions and increased productivity which quickly offset the short-term economic costs. Other measures of the working environment would better gauge the condition of employment. One of these would be comparative figures on workman's compensation and injuries. Another would be the proportion of the labour force enrolled in pension plans at their place of work. A third would be a measure of the mobility of the labour force in terms of job turnover not related to promotion. A fourth would be the converse of the third, job change related to promotion. Most of the above information could be calculated from income tax returns and would provide a clearer view of current conditions. | |

SOURCE:
Unpublished Labour Canada data for strike days and Statistics Canada data for labour force, 1971 Census of Canada, Catalogue 94–705, 1974.
**Less than ½ of one day.

# STRIKE DAYS LOST



# PHYSICAL DEVELOPMENT

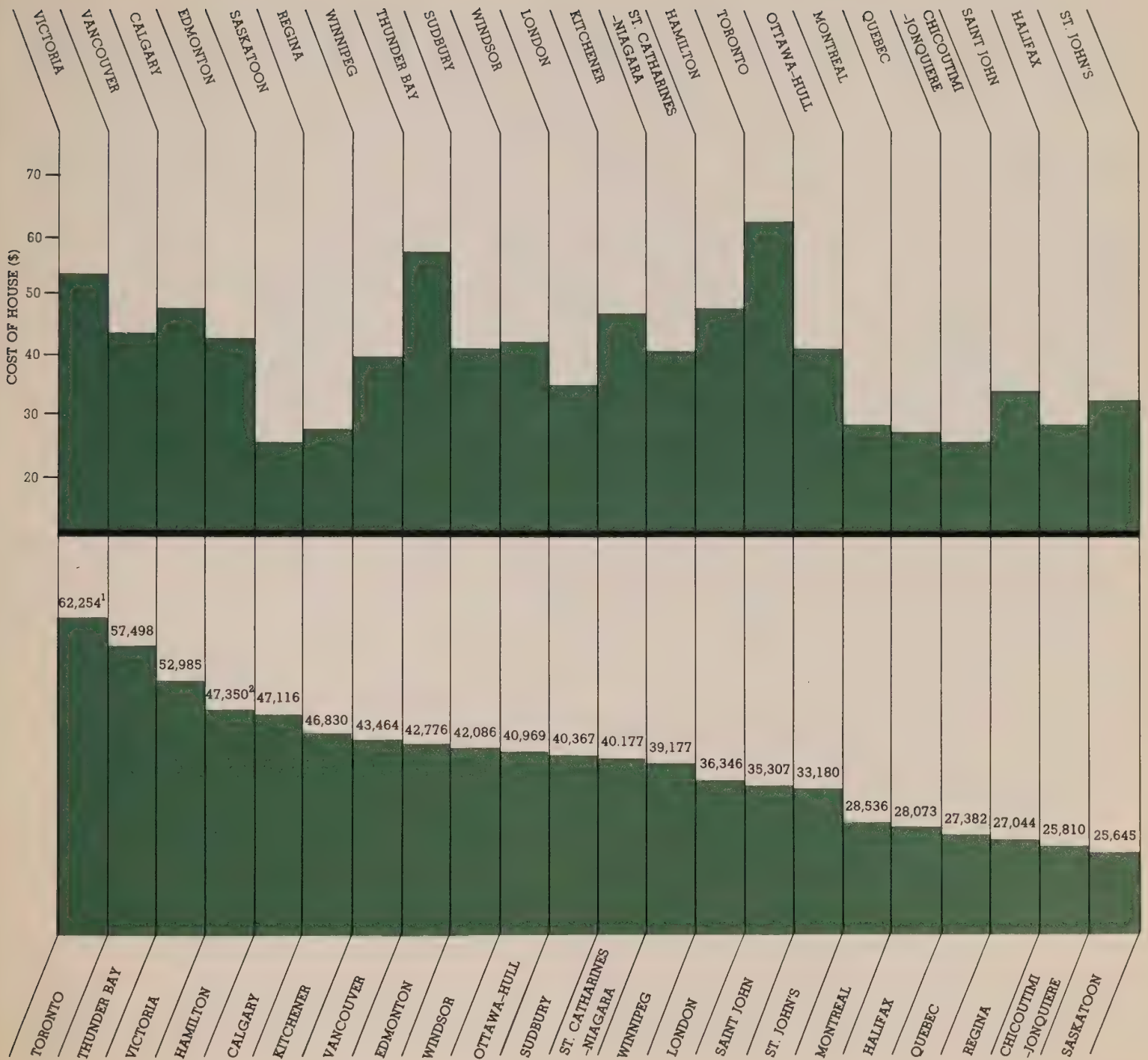


| | | |
|---|---|---|
| ASPECT MEASURED | The average cost of a new single-detached dwelling financed under NHA in a particular market will reflect what someone in that market is most often paying. The housing package purchased (that is how large, how well equipped, with what size lot, etc.) may | vary from city to city; however, this average does represent what available housing will cost. The measure thus compares actual purchase prices rather than costs for comparable housing. |
| CONSIDERATION OF THE MEASURE | 1. AREA COVERAGE<br>The cost figures are compiled for large urban centres and urban agglomerations of 40,000 or more as well as for the 22 CMAs.<br>2. TEMPORAL COVERAGE<br>The data are collected quarterly in unpublished form and yearly averages are published annually in Canadian Housing Statistics.<br>3. OTHER COVERAGE INCOMPATIBILITIES<br>New single-detached dwellings financed under NHA represent only one type of dwelling unit, and these figures do not necessarily approximate the average for all resale housing or non-NHA financed new detached dwellings. The characteristics of the dwellings for which data are presented here vary from city to city. Other data show that there are differences in average size, land costs, construction costs, etc. between CMAs. CMHC also points out certain problems with the estimates:<br>"The cost estimates presented in these tables are made by loan applicants, either owner-applicants or builders, at time of approval. The data on land costs include estimates made by builders who develop their own land, and are usually based on local market values. It must be noted that these estimates, to the extent that they accurately reflect market values, vary with changing proportions of fully serviced, partially | serviced, and unserviced lots. In the case of serviced lots, prices also vary with changes in the method of financing as between municipal financing, where part of the cost is covered by local improvement charges, and full financing by the builders of developers." (Canadian Housing Statistics, 1974, p. 98.)<br>4. COLLECTION<br>Data are collected quarterly by CMHC regional offices, compiled in the Statistical Handbook and published annually in Canadian Housing Statistics.<br>5. COMPUTATION<br>Figures are taken directly from tabulations by CMHC. |
| OTHER MEASURES | As outlined above, these cost figures represent only a limited part of the housing market. Costs for other types of housing are available from real-estate boards, trust companies and some of the larger nation-wide corporations which index salaries on the basis of housing costs. The only measures of housing costs for both owner-occupied and rental dwellings is that | collected for the census, and consequently available only once every 10 years in Catalogue 93–732. |

SOURCE:
CMHC Statistical Handbook, 1974, p. C-4.

1. Figure available for 3rd quarter only.
2. Figure available for 2nd quarter only.

# HOUSING COSTS



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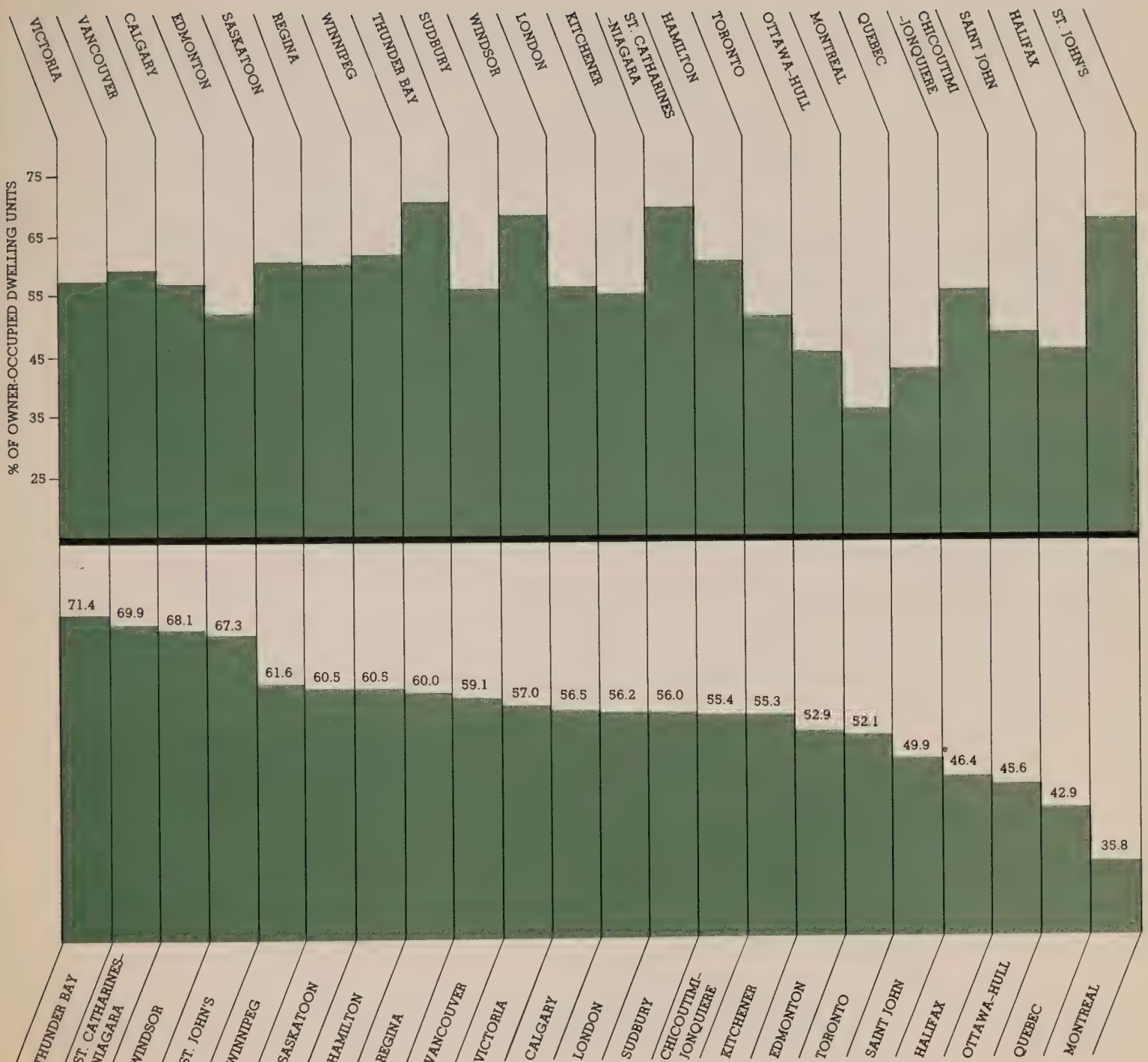
|---|---|---|
| ASPECT MEASURED | Occupancy status is a measure of ownership rates for dwelling units of all types. It is likely that those who own their dwelling have a greater interest in their community, are less transient, and may devote more time and money to maintaining and improving their | home environment. Survey research has shown that most Canadians desire a house of their own and, consequently, this indicator shows the extent to which people in each city have realized that goal. |
| CONSIDERATION OF THE MEASURE | 1. AREA COVERAGE<br>In addition to the 22 CMAs presented here, data are available for large urban centres and urban agglomerations of 40,000 or more.<br>2. TEMPORAL COVERAGE<br>Data used in estimates are available annually, while figures on actual distributions are collected for census years only.<br>3. OTHER COVERAGE INCOMPATIBILITIES<br>None are immediately evident.<br>4. COLLECTION<br>Base figures are from Statistics Canada, 1971 Census of Canada, Catalogue, 93–727, 1973 Estimates for 1974, as outlined below, are based on annual reporting of housing completions by type found in Canadian Housing Statistics, CMHC, 1974.<br>5. COMPUTATION<br>On the basis of the percentages of dwelling units of each type (single-detached, single-attached and apartment) which were owner-occupied according to the 1971 | Census, estimates were made of the number of new completions between 1971 and 1974 which would also have been owner-occupied. These new owner-occupied units were added to the total of existing owner-occupied units in 1971 (from the Census figures) and a percentage calculated to estimate the 1974 distribution. |
| OTHER MEASURES | Other than an actual survey of tenure completed between census years, no other measures seem apparent. | |

SOURCE:
Statistics Canada, 1971 Census of Canada, Catalogue 93–727, 1973, and Canadian Housing Statistics, CMHC, 1974.

# TENURE


% OF OWNER-OCCUPIED DWELLING UNITS
75
65
55
45
35
25
VICTORIA
VANCOUVER
CALGARY
EDMONTON
SASKATOON
REGINA
WINNIPEG
THUNDER BAY
SUDBURY
WINDSOR
LONDON
KITCHENER
ST. CATHARINES -NIAGARA
HAMILTON
TORONTO
OTTAWA-HULL
MONTREAL
QUEBEC
CHICOUTIMI -JONQUIERE
SAINT JOHN
HALIFAX
ST. JOHN'S
71.4
69.9
68.1
67.3
61.6
60.5
60.5
60.0
59.1
57.0
56.5
56.2
56.0
55.4
55.3
52.9
52.1
49.9
46.4
45.6
42.9
35.8
THUNDER BAY
ST. CATHARINES-NIAGARA
WINDSOR
ST. JOHN'S
WINNIPEG
SASKATOON
HAMILTON
REGINA
VANCOUVER
VICTORIA
CALGARY
LONDON
SUDBURY
CHICOUTIMI-JONQUIERE
KITCHENER
EDMONTON
TORONTO
SAINT JOHN
HALIFAX
OTTAWA-HULL
QUEBEC
MONTREAL

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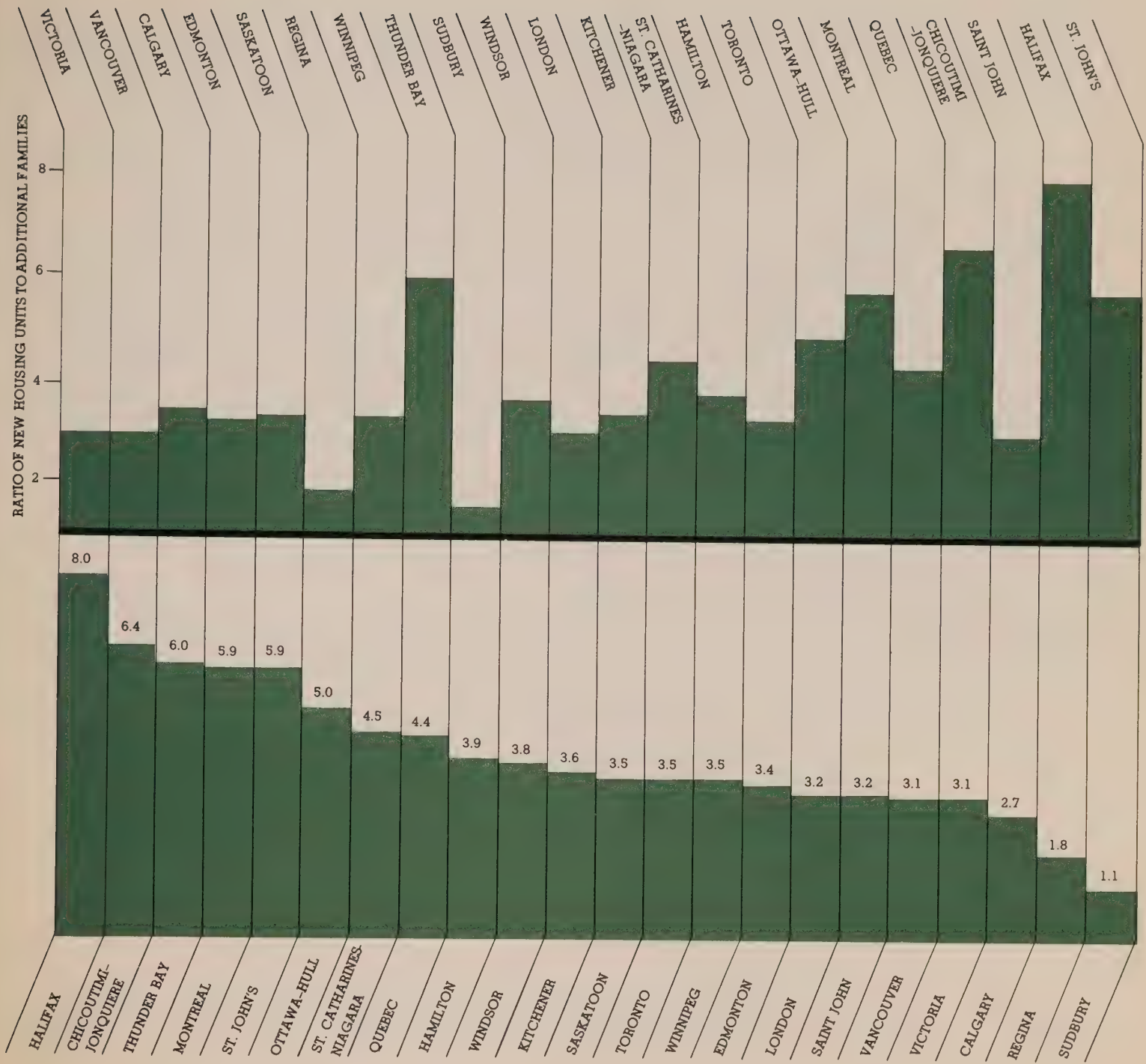
|---|---|---|
| ASPECT MEASURED | The ratio of number of new housing units to additional families is a measure of the balance between the supply and demand of housing and thus reflects the range of housing choice available to those moving both within and between cities. In many cases, this balance will affect the cost of housing, as limited supply may force prices up. It is particularly important to know for rapidly growing centres whether new construction is keeping up with increases in population. This index compares the number of new units added to the housing stock with the number of additional families in the city during the same time period. Both migration and family formation contribute to such increases in population. | |
| CONSIDERATION OF THE MEASURE | 1. AREA COVERAGE<br>The index can only be computed for the 22 CMAs.<br>2. TEMPORAL COVERAGE<br>The housing construction figures and growth estimates from which the index is computed are both collected annually. Housing statistics are available in March for the previous year, while publication time of population estimates varies.<br>3. OTHER COVERAGE INCOMPATIBILITIES<br>Data on changes in total housing supply do not exist. Consequently the only changes which can be considered are additions to the stock through new construction. Changes which result from demolitions and conversions are thus not considered. In the absence of actual annual population counts for the CMAs, population estimates must be used to derive growth rates, and in some cases the validity of these can be questioned (the 1973 estimate for Halifax was rejected for this reason).<br>4. COLLECTION<br>Housing completions are published for calendar years by CMHC on the basis of reports from their regional offices. Estimated populations of the CMA's are published annually for June 1 of respective years by Statistics Canada, Catalogue 91-207. | Household size averages come from the 1971 Census of Canada, Catalogue 93-702.<br>5. COMPUTATION<br>Number of additional families was derived from estimates of total population growth divided by average household size in each CMA according to 1971 Census figures. Number of new units built 1970-1973 was computed by summing completions for each of those years. The index is simply the latter divided by the former. |
| OTHER MEASURES | Ideally the housing supply/demand balance would be the total available housing divided by the number of families seeking accommodation. Available housing would include new units, existing vacant units and conversions, minus demolitions. Number of families would include migrants, newly formed households, and undoubling. Better measures would include more of these variables when data are available, rather than simply the new units and the estimate of number of families used here.<br><br>SOURCE:<br>Statistics Canada, Catalogue 91-207 (annual) and Canadian Housing Statistics, CMHC, 1974. | |

# NEW HOUSING


RATIO OF NEW HOUSING UNITS TO ADDITIONAL FAMILIES
8
6
4
2
VICTORIA
VANCOUVER
CALGARY
EDMONTON
SASKATOON
REGINA
WINNIPEG
THUNDER BAY
SUDBURY
WINDSOR
LONDON
KITCHENER
ST. CATHARINES -NIAGARA
HAMILTON
TORONTO
OTTAWA-HULL
MONTREAL
QUEBEC
CHICOUTIMI -JONQUIERE
SAINT JOHN
HALIFAX
ST. JOHN'S
8.0
6.4
6.0
5.9
5.9
5.0
4.5
4.4
3.9
3.8
3.6
3.5
3.5
3.5
3.4
3.2
3.2
3.1
3.1
2.7
1.8
1.1
HALIFAX
CHICOUTIMI-JONQUIERE
THUNDER BAY
MONTREAL
ST. JOHN'S
OTTAWA-HULL
ST. CATHARINES-NIAGARA
QUEBEC
HAMILTON
WINDSOR
KITCHENER
SASKATOON
TORONTO
WINNIPEG
EDMONTON
LONDON
SAINT JOHN
VANCOUVER
VICTORIA
CALGARY
REGINA
SUDBURY

| | | |
|---|---|---|
| ASPECT MEASURED | Housing type is an important aspect of the built environment of cities. The overall form of the city, particularly its skyline and density, is primarily affected by the proportion of apartments as presented here. From the point of view of the home environment, housing type has a considerable impact on day-to-day activities and residential satisfaction. By measuring both the existing distribution and the rate at which additonal apartments are being added by current construction, an idea of both current conditions and future trends can be obtained. |
| CONSIDERATION OF THE MEASURE | 1. AREA COVERAGE<br>In addition to the 22 CMAs presented here, data are available for large urban centres and urban agglomerations of 40,000 or more.<br>2. TEMPORAL COVERAGE<br>Data used in estimates are available annually while figures on actual distributions are collected for census years only.<br>3. OTHER COVERAGE INCOMPATIBILITIES<br>Data on row housing is presented separately in Canadian Housing Statistics, while in the Census, row housing is tabulated as "single-attached" along with semi-detached. This makes it impossible to estimate the proportion of row housing—an increasingly important type of housing. Also the data do not permit calculations for type of housing demolished, which might change the proportions. | 4. COLLECTION<br>Base figures on housing stock are from Statistics Canada, 1971 Census of Canada, Catalogue 93-727, 1973. Estimates for 1974, as outlined below, and 1974 starts are based on annual reporting on construction activity found in Canadian Housing Statistics, CMHC, 1974.<br>5. COMPUTATION<br>New completions between 1971 and 1974 by type were added to the existing distribution of housing type for 1971 from the Census of that year, to give 1974 estimates. The percentage of apartments in the total stock was then calculated. |
| OTHER MEASURES | Percentage of apartment units and housing distribution more generally reflect density. It would be of interest to have direct reporting of density figures for each city, but these are not collected on a comparable basis. One other aspect of housing type involves the question of families and apartments. With an increasing number of families living in apartments, by choice or necessity, it would be interesting to have a measure of the number of children living in apartments in each city. | |

SOURCE:
Statistics Canada, 1971 Census of Canada, Catalogue 93–727, 1973, and Canadian Housing Statistics, CMHC, 1974.
*Includes apartments, flats and duplexes but not row housing.

# APARTMENTS*

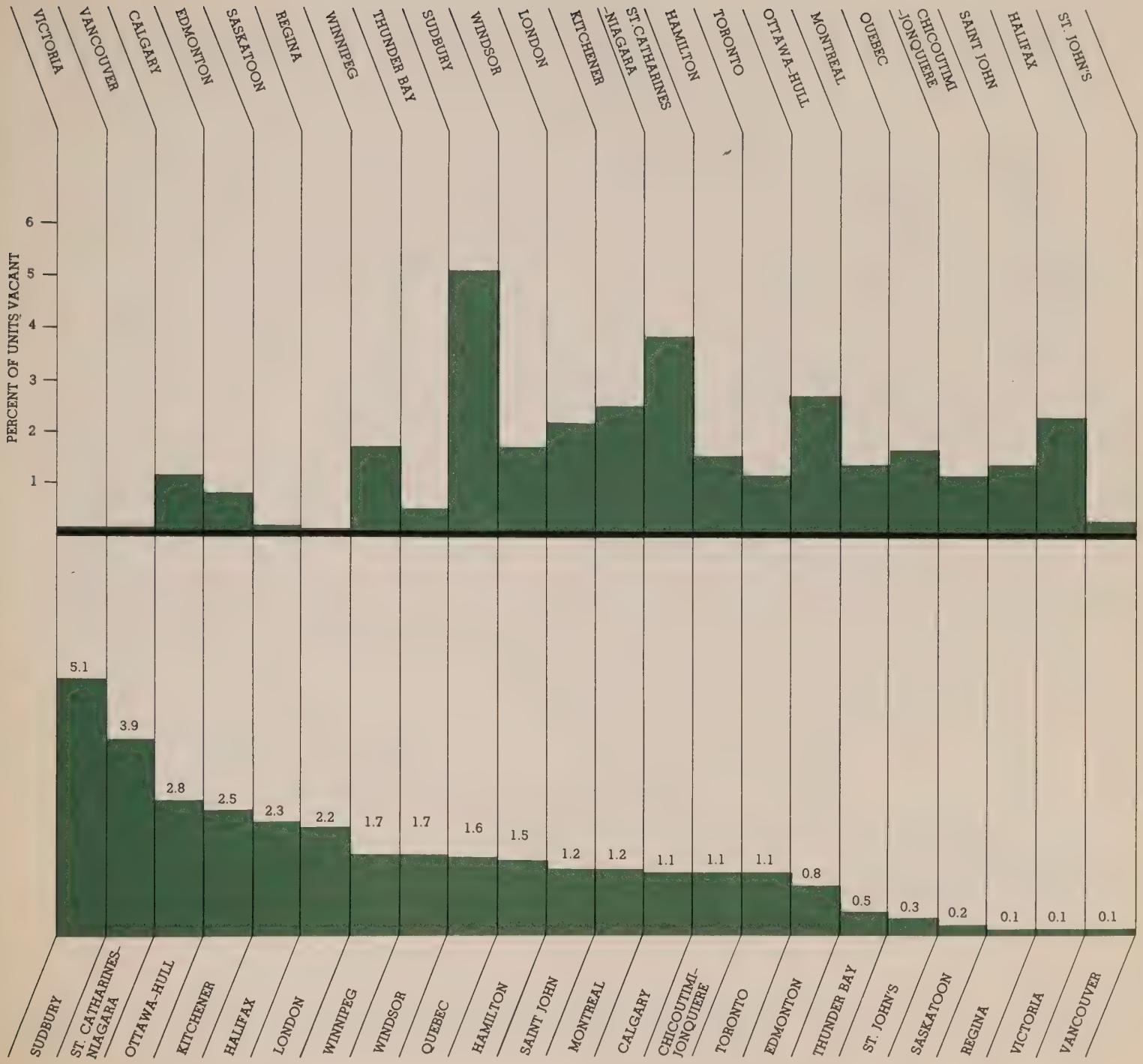
APARTMENT UNITS AS A % OF HOUSING STOCK
50
40
30
20
VICTORIA
VANCOUVER
CALGARY
EDMONTON
SASKATOON
REGINA
WINNIPEG
THUNDER BAY
SUDBURY
WINDSOR
LONDON
KITCHENER
ST. CATHARINES -NIAGARA
HAMILTON
TORONTO
OTTAWA-HULL
MONTREAL
QUEBEC
CHICOUTIMI -JONQUIERE
SAINT JOHN
HALIFAX
ST. JOHN'S
51.6
49.2
45.0
43.9
43.4
39.5
36.7
36.7
35.0
35.0
34.2
33.7
32.9
32.2
31.7
30.4
26.4
25.9
24.9
23.3
23.0
21.1
MONTREAL
QUEBEC
SAINT JOHN
HALIFAX
OTTAWA-HULL
TORONTO
KITCHENER
CHICOUTIMI-JONQUIERE
WINNIPEG
VICTORIA
LONDON
SUDBURY
HAMILTON
EDMONTON
VANCOUVER
CALGARY
REGINA
SASKATOON
WINDSOR
ST. JOHN'S
ST. CATHARINES-NIAGARA
THUNDER BAY

| | | |
|---|---|---|
| ASPECT MEASURED | Vacancy rates measure the extent to which those moving to or within a city have a choice of residence. It can also be expected that a moderate vacancy level—3% according to most thinking—is necessary to ensure some | competition in prices. High vacancy rates will maximize choice, but exceptionally high rates may occasion instability in the residential construction industry. |
| CONSIDERATION OF THE MEASURE | 1. AREA COVERAGE<br>Data are collected for the 22 CMAs only.<br>2. TEMPORAL COVERAGE<br>Vacancy rates are compiled twice yearly, in June and December.<br>3. OTHER COVERAGE INCOMPATIBILITIES<br>Vacancy rates are collected only for apartment structures of six units and over, thus omitting a considerable proportion of rental units, particularly in those cities which do not have a high proportion of apartment units in larger buildings. | 4. COLLECTION<br>The data are collected by CMHC from their regional offices on the basis of a sample survey, and published annually, in March for the preceding year, in Canadian Housing Statistics.<br>5. COMPUTATION<br>The measure is taken directly from published figures. |
| OTHER MEASURES | The vacancy rate measure presented here is only for apartments. A comparative figure for other types of units would be useful. It is also possible to consider the average length of | time resale housing is on the market before being sold, and the length of time between completion and sale of new housing. |



SOURCES:
Canadian Housing Statistics, CMHC, 1974.

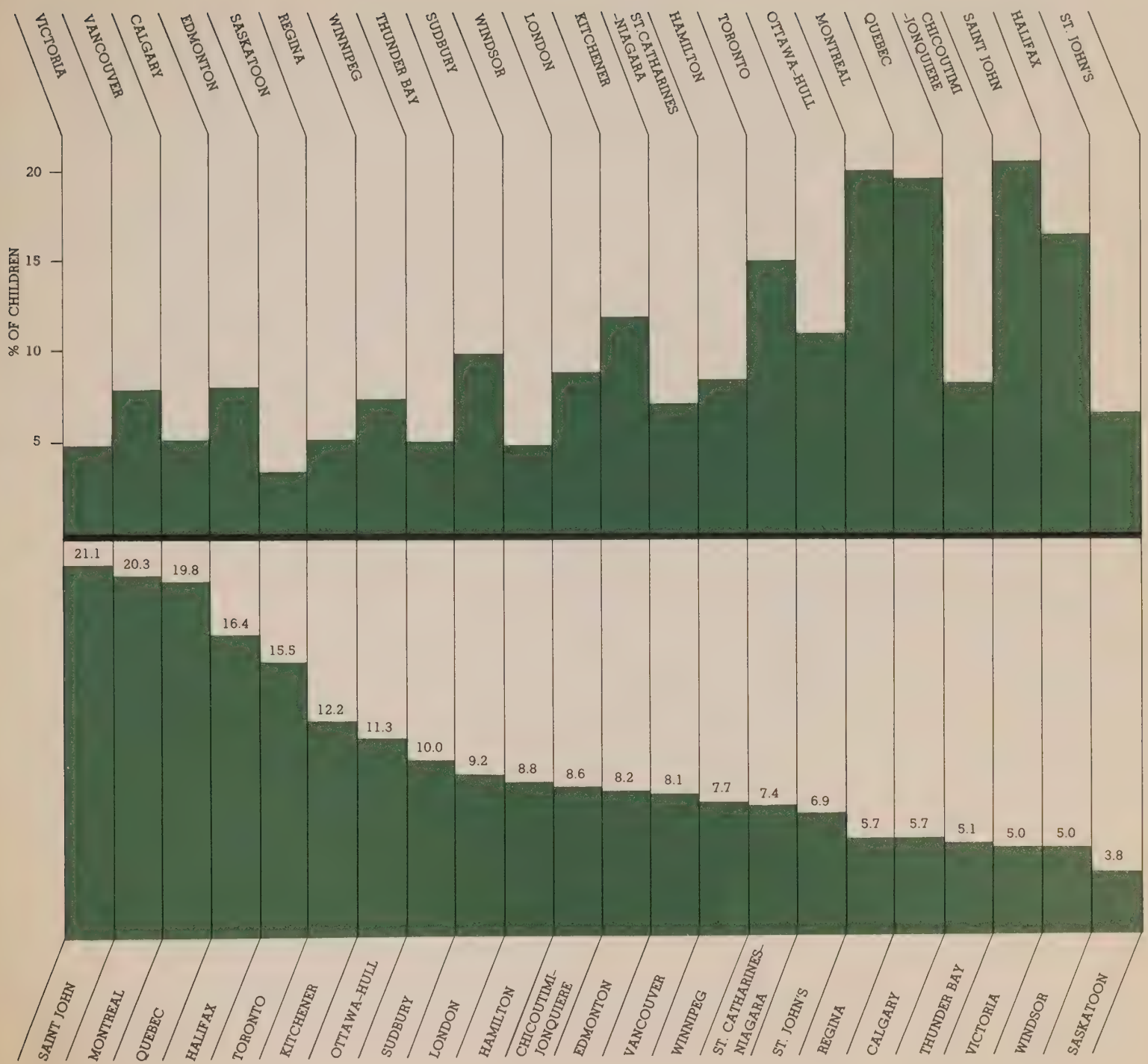
# APARTMENT VACANCIES



| | | |
|---|---|---|
| ASPECT MEASURED | Percent of children living in apartments can be seen to measure the extent to which the physical environment of the home may present problems for young families. Canadians still overwhelmingly prefer single-family housing, particularly for families with children. Apartment living may mean a lack of indoor and outdoor play areas for children, problems in supervising outdoor activities, and lack of audio and visual privacy within the dwelling. | The indicator consequently reflects the proportion of children in each CMA who may be living in difficult or even unsuitable environments. |
| CONSIDERATION OF THE MEASURE | 1. AREA COVERAGE<br>A special tabulation was made for CMAs, but presumably the data could be obtained for all census area units from the census tract up.<br>2. TEMPORAL COVERAGE<br>Data are available for census years only.<br>3. OTHER COVERAGE INCOMPATIBILITIES<br>The definition of children may be too inclusive. Also the age structures of the CMAs vary, with the result that there may be more "children" overall in some cities. However it is still important to identify what proportion are living in apartments. | 4. COLLECTION<br>The data were collected from a special tabulation using 1971 census data on file at Statistics Canada.<br>5. COMPUTATION<br>The indicator was derived from a straight percentaging of number of children in apartments over total number of children under 25 in each CMA. |
| OTHER MEASURES | It might be of greater interest to focus on children in particular age groups, using the same data file. Other characteristics of the physical environments of children might also be of interest, but little data exist for these. | However, the size of apartment building could be done, as could the floor on which children live, say the percentage of children living above the ground floor. |

SOURCE:
Statistics Canada, 1971 Census of Canada, Special Tabulation.
*The Census definition of children, as sons and daughters under 25 years who have never married and are living at home.

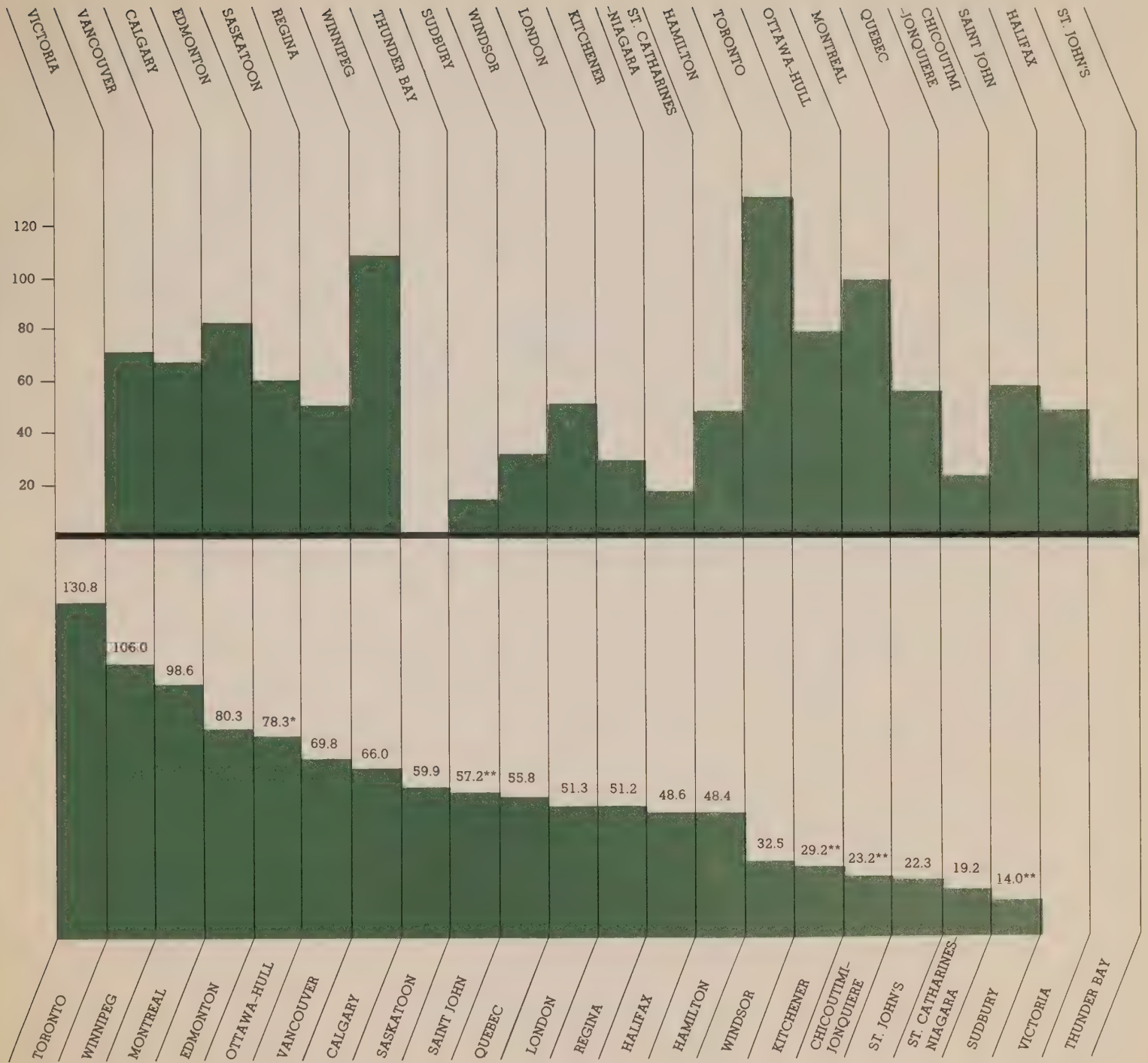
# CHILDREN IN APARTMENTS*



| | | |
|---|---|---|
| ASPECT MEASURED | Fare passengers carried is the annual total of one-way fares carried. It is a measure of both the availability of public transit and the extent of its use. The potential number of passengers will depend upon the number of vehicles, length of routes, and so on. Usage will | depend on quality of service, local preferences, costs and other factors. Taken together, these factors influence the extent to which public transit is used as a means of transportation by residents of each city. |
| CONSIDERATION OF THE MEASURE | 1. AREA COVERAGE<br>Data on public transit are available on an annual basis for 20 CMAs. Thunder Bay, and Victoria report infrequently and are not on master file. Data are based on the operations of the transit companies in the respective CMAs although these do not necessarily cover the entire metropolitan area. No data exist for the Hull transporation system, so data for Ottawa alone is presented.<br>2. TEMPORAL COVERAGE<br>The data are collected annually, although there are some gaps as indicated in the footnotes. The most recent data are for 1972, so it would seem that some time is required in processing before data become available.<br>3. OTHER COVERAGE INCOMPATIBILITIES<br>"Fare passengers carried" includes buses, trolleys, street cars, and subways. In most cities, buses are the exclusive mode of public transit. In Toronto and Montreal, the use of subways increases considerably the number of passengers carried. | 4. COLLECTION<br>The data are collected and kept on file by Statistics Canada on the basis of reports by individual transit companies. It is consequently dependent on the diligence of those individuals who gather and relay this information.<br>5. COMPUTATION<br>The data are presented separately for buses, trolleys, street cars, other (i.e. subways), intercity-rural, and chartered. For this indicator, the first four—buses, trolleys, street cars, and other—were added and divided by 1972 estimated population from Statistics Canada, Catalogue 91-207. |
| OTHER MEASURES | Availability of public transit can be measured in a number of different ways on the basis of data from the same source. These include: total miles of routes, seat miles (number of seats multiplied by number of miles) and actual numbers of rolling stock.<br>Of more interest would be measures of frequency of service, average time required for specified journeys and so on. However, these data are not presently collected. These | measures should ultimately be compared to private transportation data on cost, access and the like. |

SOURCE:
Statistics Canada, unpublished data, 1972
*Ottawa only; does not include Hull and environs.
**1971 data

# PUBLIC TRANSPORTATION



| | | |
|---|---|---|
| ASPECT MEASURED | Suspended Particulate Matter Counts measure pollutants which affect air quality. Other pollutants also affect air quality and may be more hazardous to health but, with the exception of sulphur dioxide, consistent data do not exist for these for the range of cities presented here. In fact, there is little | agreement on which pollutants should be monitored or on their relative importance. Consequently, the validity of this indicator is open to serious question. |
| CONSIDERATION OF THE MEASURE | 1. AREA COVERAGE<br>The data are collected by individual stations in cities according to guidelines established by the respective provinces. The data may not be representative of the entire metropolitan area since levels are highly dependent on the location of the stations, usually in commercial downtown core areas. Data on suspended particulate matter are collected for the 20 CMAs presented here.<br>2. TEMPORAL COVERAGE<br>Pollutant levels are monitored constantly and data are available on a monthly and even weekly basis. Annual figures presented here are averages.<br>3. OTHER COVERAGE INCOMPATIBILITIES<br>Monitoring stations in any city may change from one year to the next, with the opening or closing of particular stations. Consequently, comparisons between years should be made with care. | 4. COLLECTION<br>The data are collected by local monitoring stations and forwarded to the provinces. The data here were compiled from individual provincial data by Dr. H. Inhaber of the Science Policy Branch, Environment Canada.<br>5. COMPUTATION<br>$I_{spm} \sqrt[n]{(C_1 x\ C_2 x\ C_3 x\ \ldots\ C_n)/70}$ where n is the number of weekly readings per station in a month, and the Cs are the weekly concentrations in micrograms per cubic metre. The figure 70 $cm^{-3}$ is the standard to protect health. The arithmetic average of the monthly average computed in this way was taken as the annual average. The annual suspended particulate matter indices for each station in the same location were than averaged. |
| OTHER MEASURES | Other pollutants considered detrimental to air quality are carbon monoxide, oxides of nitrogen, total oxides and lead. A coefficient of haze which measures visibility as affected primarily by a particulate matter is also recorded. At present these measures are collected only in Ontario and Alberta, and for the city of Montreal.<br>It has been suggested that pollutants can be combined into a single index for each city on the basis of equal weighting of pollutants | and a national index weighting each city according to its population.[1] Another index weights each pollutant according to a "relative severity factor" derived from the 24-hour air quality criteria of the Ontario Ministry of the Environment.[2] Again, data for the construction of such indices exist only for Ontario, Alberta and Montreal. |

[1] "Environmental Quality: Outline for a National Index for Canada," H. Inhaber, Science, 29 November 1974, Vol. 186, pp. 798-805.

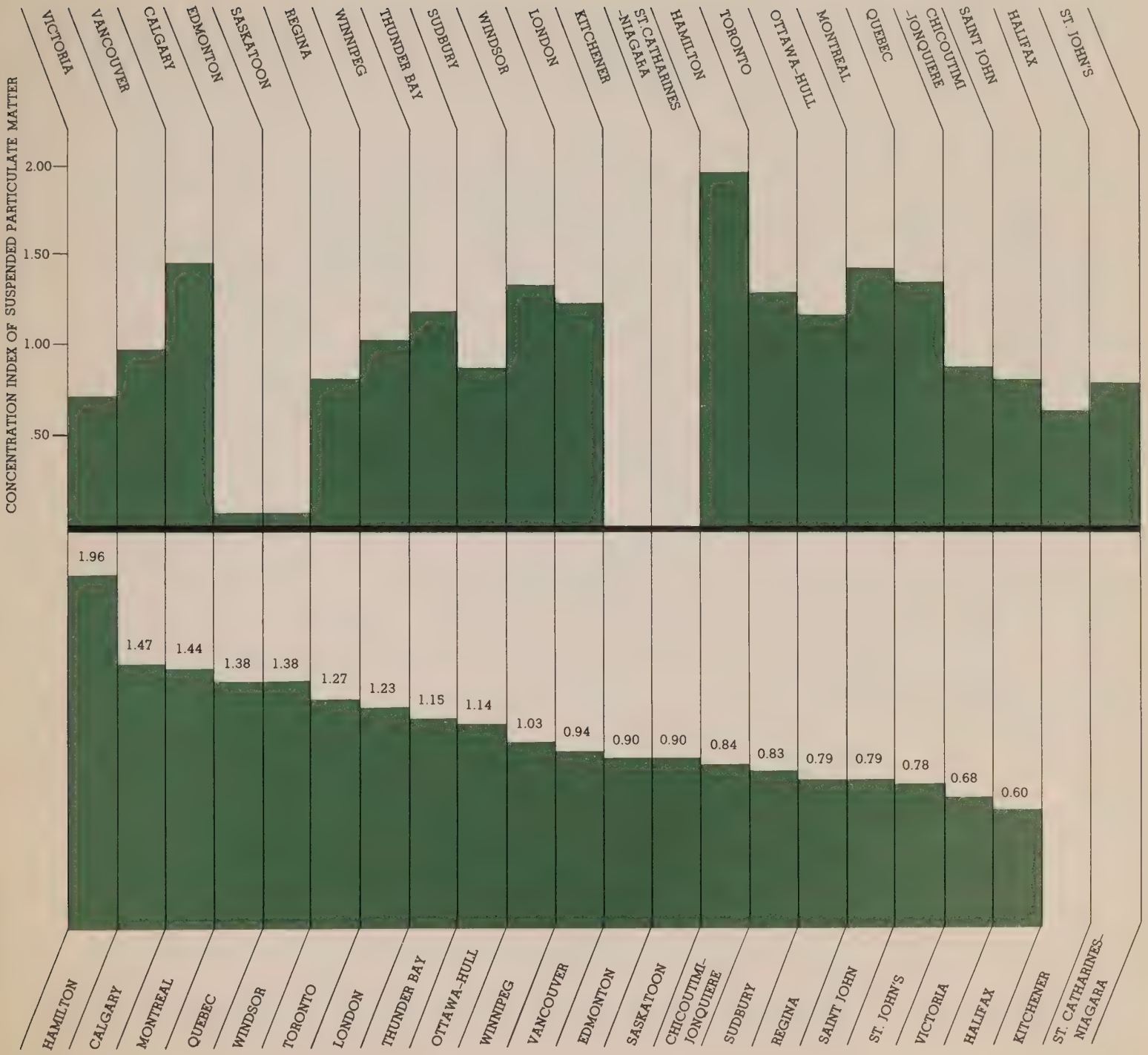
[2] Economic Targets and Social Indicators, Eleventh Annual Review, Economic Council of Canada, Information Canada, Ottawa 1974, pp. 216-222.

SOURCE:
Unpublished data from the Science Policy Branch, Environment Canada.

PHYSICAL DEVELOPMENT # 30

# AIR QUALITY

## (Suspended Particulate Matter)



ASPECT MEASURED

Sulphur dioxide is a pollutant which affects air quality. Other pollutants also affect air quality and may be more hazardous to health, but consistent data (excepting for data on suspended particulate matter) do not exist for these for the range of cities presented here.

In fact, there is little agreement on which pollutants should be monitored or on their relative importance. Consequently, the validity of this indicator is subject to question.

CONSIDERATION OF THE MEASURE

1. AREA COVERAGE

The data are collected by individual stations in cities according to guidelines established by the respective provinces. The data may not be representative of the entire metropolitan area since levels are highly dependent on the location of the stations, usually in commercial downtown core areas. Data on sulphur dioxide are collected for 17 CMAs.

2. TEMPORAL COVERAGE

Pollutant levels are monitored constantly and data are available on a monthly and even weekly basis. Annual figures presented here are averages.

3. OTHER COVERAGE INCOMPATIBILITIES

Monitoring stations in any city may change from one year to the next, with the opening or closing of particular stations. Consequently, comparisons between years should be made with care.

4. COLLECTION

The data are collected by local monitoring stations and forwarded to the provinces. The data here was compiled from individual provincial data by Dr. H. Inhaber of the Science Policy Branch, Environment Canada.

5. COMPUTATION

$$I_{SO_2} = \tfrac{1}{2} \times \frac{1}{.02} \left[ \frac{C_a \sqrt{\sum_{i-n}^{n} (Cd_i)^2}}{n} \right]$$

Where $C_a$ is the annual average concentration in parts per million; .02 is the annual standard to protect health; $Cd_i$ is the daily concentration; and n is the number of readings in a month.

OTHER MEASURES

Other pollutants considered detrimental to air quality are carbon monoxide, oxides of nitrogen, total oxides and lead. A coefficient of haze which measures visibility as affected primarily by particulate matter is also recorded. At present these measures are collected only in Ontario and Alberta, and for the city of Montreal. It has been suggested that pollutants can be combined into a single index for each city on the basis of equal weighting of pollutants and a national average index calculated by weighting each city's index according to its population.[1.]

Another index weights each pollutant according to a "relative severity factor" derived from the 24-hour air quality criteria of the Ontario Ministry of the Environment.[2.] Again, data for the construction of such indices exist only for Ontario, Alberta and Montreal.

1. "Environmental Quality: Outline for a National Index for Canada," H. Inhaber, Science, 29 November 1974, Vol. 186, pp. 798-805.

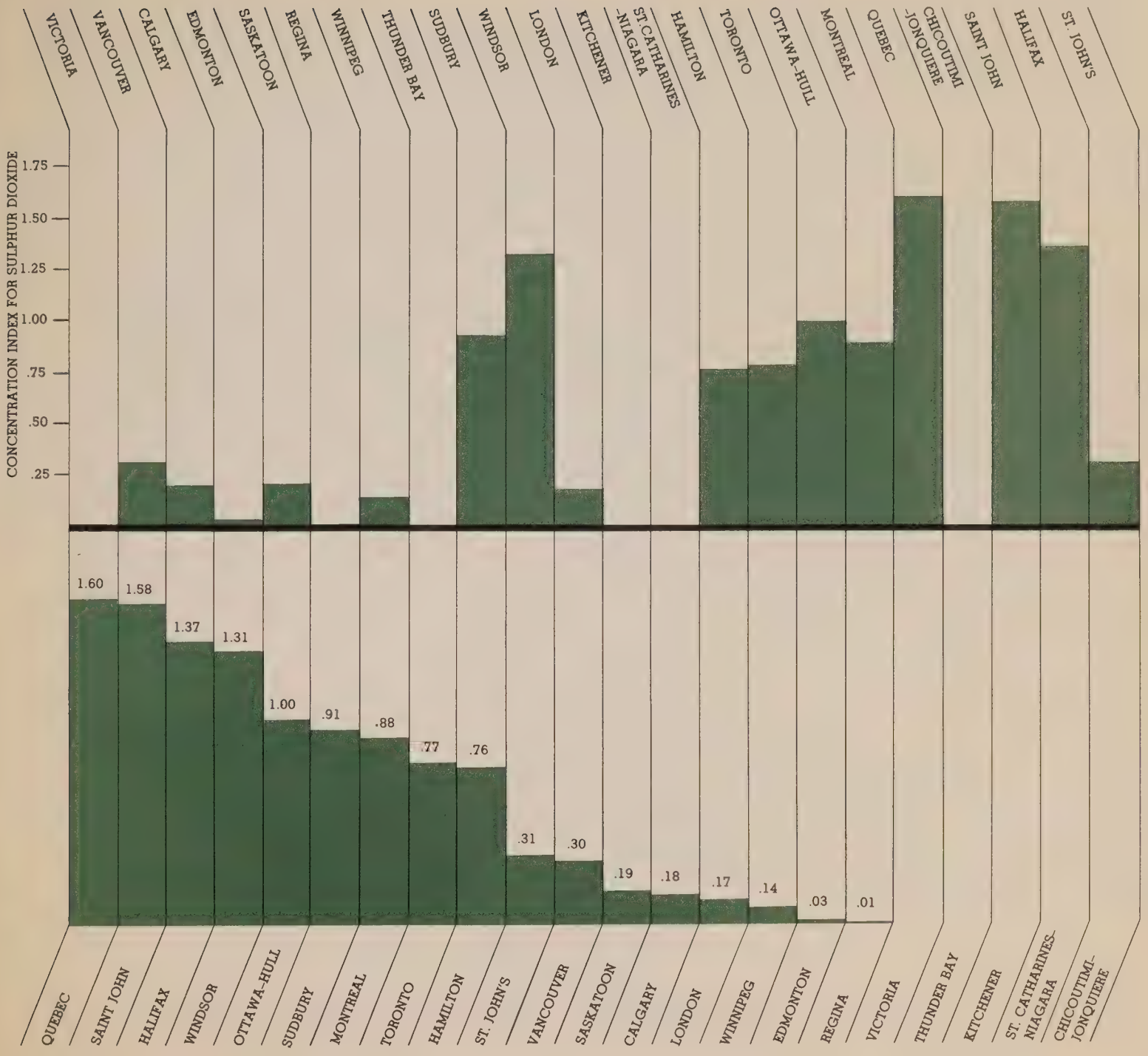
2. Economic Targets and Social Indicators, Eleventh Annual Review, Economic Council of Canada, Information Canada, Ottawa 1974, pp. 216-222.

SOURCE:
Unpublished Data from the Science Policy Branch, Environment Canada.

PHYSICAL DEVELOPMENT # 31

# AIR QUALITY

## (Sulphur Dioxide Concentration)

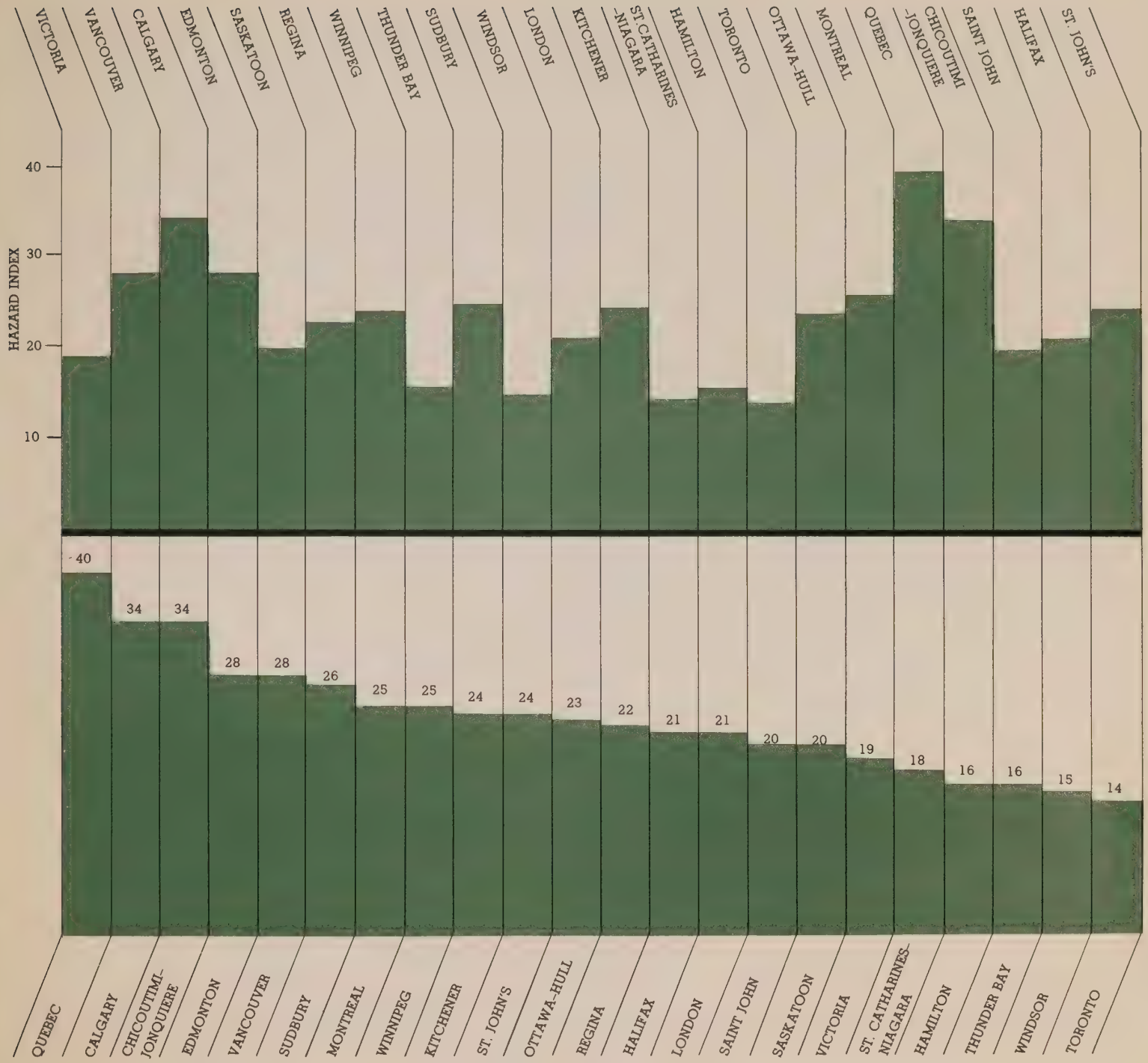


| | |
|---|---|
| ASPECT MEASURED | The hazard index measures the probability of property loss due to a fire or a traffic accident and thus is an indirect measure of safety. We stress that this is not a measure of magnitude of damage, but solely of numerical incidence. The measure tends thus to reflect safety levels from an inconvenience aspect rather than a physical damage aspect. |
| CONSIDERATION OF THE MEASURE | 1. AREA COVERAGE<br>The areas covered are not compatible with CMAs. Thus the areas used here are major urban areas which are comprised of a grouping of municipalities to approximate the CMAs. The St. John's major urban area comprises 67% of the population of the actual CMA while the Calgary major urban area is synonymous with its CMA and the St. Catharines-Niagara major urban area exceeds the size of its CMA by 14%. The end result is probably a higher value on the index for St. John's, Sudbury, Victoria, Halifax and Saint John than might be the case if a CMA estimate were employed, simply because the less urbanized areas are not included to the same degree as they are with other cities. Data at a submetropolitan scale are not readily available.<br>2. TEMPORAL COVERAGE<br>Data are reported annually, although a lag of two to three years occurs before publications become available. The traffic accident data are from Statistics Canada. The fire data are from the Annual Report of the Dominion Fire Commissioner.<br>3. OTHER COVERAGE INCOMPATIBILITIES<br>With the traffic enforcement data there may be regional differences in reporting accidents or in assessing the extent of damages. There may also be a bias insofar as non-local police forces do not record accidents occurring on provincial highways passing through the municipality.<br>4. COLLECTION<br>The collection of traffic enforcement data is carried out by local police forces and compiled by Statistics Canada. Since these are official records it is likely that accuracy is high. Data on fires are collected by local fire departments and compiled by the Dominion Fire Commissioner's office. Sources are Statistics Canada, Traffic Enforcement Statistics, 1971, Catalogue 85-206, and the Annual Report of the Dominion Fire Commissioner, Fire Losses in Canada, 1971.<br>5. COMPUTATION<br>The hazard index has two parts. First the per capita number of traffic accidents where damage exceeds $100 is compiled. Second, a figure for the number of fires is compiled. The two are added and then divided by population to give the hazard index. |
| OTHER MEASURES | As a measure of safety, the hazard index could definitely be replaced. If the data were available, injuries and fatalities would be better measures of both traffic and fire accidents. It would seem to be more appropriate to consider each separately.<br>For fire loss, good measures of the nature and scope of the problem would be injuries and fatalities, uninsured losses and unemployment resulting from fires. Better measures for traffic accidents than gross numbers of accidents would be number of fatalities and injuries, and total dollar damage including cost of personal and family disruptions and medical costs. To some extent surrogates of dollar losses could be had from the comparative rates of insurance. However, these are not readily available.<br>Other measures would include pedestrians and cyclists injured. Most cities keep counts on these and prepare pin maps of locations. These could be readily collected and comparisons done both between and within metropolitan areas. |

SOURCE:
"Traffic Enforcement Statistics 1971," Statistics Canada —Catalogue 85-206 (annual) and "Fire Losses in Canada 1971," Report of the Dominion Fire Commissioner.

*The hazard index is the sum of the number of traffic accidents with damage exceeding $100 and of the number of fires, both adjusted for population.

# FIRE AND AUTOMOBILE HAZARD*



## SOME STATISTICAL ANALYSIS OF THE INDICATORS

A statistical investigation was undertaken for the following purposes:
(a) to determine the extent to which indicators are interrelated, i.e. whether or not there are redundant indicators;
(b) to identify clusters of related indicators; and
(c) to examine the relationship of indicators to the population size and the growth rates of Canada's major urban areas.

Spearman rank correlations were calculated to determine the degree of interrelationship among pairs of indicators. Although interval or ratio level data were generally available for calculating more detailed correlation ratios, rank correlation was used since the statistical reliability of certain indicators was dubious.

A principal components analysis of the array of urban indicators was also done to verify, in a general way, the findings of the rank correlation analysis. Considerable caution is required in interpreting the results from the principal components calculations, since the technique requires an interval or ratio level of measurement for each variable in order to provide an accurate summary of the original data set.[1] The pertinent results accompanied by interpretative commentary now follows.

[1] For further detail on methods of calculation, see:
(1) SPEARMAN RANK CORRELATION:
Blalock, Hubert M., Jr., SOCIAL STATISTICS, second edition. New York: McGraw-Hill, 1972, pp. 415-18.
Nie, N.H. et.al., STATISTICAL PACKAGE FOR THE SOCIAL SCIENCES, second edition. New York: McGraw-Hill, 1975.

(2) PRINCIPAL COMPONENTS ANALYSIS:
Rummel, R.J., APPLIED FACTOR ANALYSIS. Evanston: Northwestern University Press, 1970, pp. 338-345,
Yeates, Maurice, 1974, AN INTRODUCTION TO QUANTITATIVE ANALYSIS IN HUMAN GEOGRAPHY. Toronto: McGraw-Hill, 1974, pp. 209-230.
Nie, N.H., et. al., STATISTICAL PACKAGE FOR THE SOCIAL SCIENCES, second edition. New York: McGraw-Hill, 1975.

## ARE THERE REDUNDANT INDICATORS?

Table 1 lists statistically significant relationships among indicators. Correlations above 0.8 are relatively few. Only four pairs of variables are sufficiently associated to suggest that they measure essentially the same thing. "Economic well-being of urban residents" and "type and tenancy of housing" are the two variables with which several of the indicators appear to have "doubled up," suggesting that one of these is redundant. Pairs of indicators exhibiting high Spearman rank correlations are:
INDICATOR 17 (Average After-Tax Income, Not Adjusted) and INDICATOR 18 (Average After-Tax-Income, Adjusted for Housing Costs) $R_s = .82$
INDICATOR 24 (Occupancy Status) and INDICATOR 26 (Apartment Units as a Proportion of Housing Stock) $R_s = -.90$
INDICATOR 24 (Occupancy Status) and INDICATOR 28 (Percentage of Children Living in Apartments) $R_s = -.82$
INDICATOR 26 (Apartment Units as a Proportion of Housing Stock) and INDICATOR 28 (Percentage of Children Living in Apartments) $R_s = .84$

The results of the principal components analysis supports the results from the investigation of individual interrelationships among variables. As table 2 illustrates, the patterns of variation within the set of urban indicators are not readily reducible to a few factors. No single

TABLE ONE

SPEARMAN RANK CORRELATIONS
Listing of statistically significant relationships

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | INDEX OF STATISTICALLY SIGNIFICANT RELATIONSHIPS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| JUVENILES CHARGED 1 | | | | | .62 | | | | | | | | | | | | | | | | | | | | | | −.54 | | | | | | 2 |
| CRIMINAL CODE OFFENCES 2 | | | | | | −.63 | | | | −.51 | | .50 | .46 | | | | | | | | | | | .56 | | −.76 | | −.68 | | | **−.69 | | 7 |
| OFFENCES CLEARED 3 | | | | | | | | | | | | | .51 | | | | | | | | | | | | | | | | | | | | 1 |
| MISSING PERSONS 4 | | | | | .52 | −.55 | | | | | | | | | .52 | | | | | .57 | | | | | | | | | | | | | 4 |
| ILLEGITIMACY 5 | | | | | | −.46 | | | | | | | | .54 | .61 | | | | | | | −.65 | | | | | | | | −.60 | | | 7 |
| EDUCATIONAL LEVEL 6 | | | | | | | | .63 | | .73 | | | | −.63 | | | | | | .65 | | | | .54 | | | | .51 | −.49 * | | **.68 | | 11 |
| CULTURAL FACILITIES 7 | | | | | | | | | | | | | | | | | | | .51 | | | | | | | | | | | | | | 1 |
| PUBLIC LIBRARY USAGE 8 | | | | | | | | | | | | .61 | | .68 | | −.54 | | | | .56 | | | | | | | | −.52 | | | | | 6 |
| SOCIAL OPPORTUNITIES 9 | | | | | | | | | | | | | | | | | | | | | | | | .51 | | | | | | | | | 1 |
| CULTURAL HOMOGENEITY 10 | | | | | | | | | | .77 | | −.61 | | | | | | | | .56 | | | −.78 | | | | | | | | | | 6 |
| ETHNIC ORIGIN 11 | | | | | | | | | | | −.55 | −.68 | | | | −.50 | | | | | | | −.79 | | | | | | | | | .51 | 6 |
| FOREIGN ORIGIN 12 | | | | | | | | | | | | .64 | | | | −.56 | | | | .66 | | | | | | −.51 | | | | | **−.73 | | 8 |
| NUMBER OF ETHNIC GROUPS 13 | | | | | | | | | | | | | | | | | | | | | | | .50 | | | | | | * .56 | * .55 | | | 8 |
| POPULATION TURNOVER 14 | | | | | | | | | | | | | | | | | | | | .64 | | −.50 | | | −.49 | | | | | | **−.59 | | 7 |
| HOSPITAL BEDS 15 | | | | | | | | | | | | | | | | −.49 | | | | | | −.55 | | | | | | | | | | | 4 |
| VOTER TURNOUT 16 | | | | | | | | | | | | | | | | | | | | −.59 | | | | | | | | | | | | | 4 |
| AVERAGE INCOME (MEAN) 17 | | | | | | | | | | | | | | | | | | .82 | | | | | | | | | | | | | | | 2 |
| AVERAGE INCOME (ADJUSTED) 18 | | | | | | | | | | | | | | | | | | | .51 | | | | | | | | | | | * .51 | | | 3 |
| OCCUPATIONAL STATUS 19 | | | | | | | | | | | | | | | | | | | | | | | | .52 | | | | | ** .55 | | | | 4 |
| FEMALE LABOUR FORCE 20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | **−.67 | | 8 |
| UNEMPLOYMENT 21 | | | | | | | | | | | | | | | | | | | | | | | | | | | −.48 | | | | | | 1 |
| STRIKE DAYS LOST 22 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 3 |
| HOUSING COSTS 23 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 3 |
| TENURE 24 | | | | | | | | | | | | | | | | | | | | | | | | | | −.90 | | −.82 | | | | | 5 |
| NEW HOUSING 25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2 |
| APARTMENTS 26 | | | | | | | | | | | | | | | | | | | | | | | | | | | | .84 | | | | | 4 |
| APARTMENT VACANCIES 27 | | | | | | | | | | | | | | | | | | | | | | | | | | | | .49 | | | | | 3 |
| CHILDREN IN APARTMENTS 28 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | **.62 | | 7 |
| PUBLIC TRANSPORTATION 29 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 3 |
| AIR QUALITY (SUSPENDED PARTICULATE MATTER) 30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 3 |
| AIR QUALITY (SULPHUR DIOXIDE CONCENTRATION) 31 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 6 |
| FIRE AND AUTOMOBILE HAZARD 32 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |

NOTES

- Only the upper triangle of the square correlation matrix is displayed, since the lower triangle is the mirror image of the upper triangle.
- Statistical significance was established at the .01 level.
- Number of cases 22, unless otherwise specified.
  * Number of cases 20
  ** Number of cases 17
- To assist you in reading the matrix the number for each indicator has been placed in the appropriate cell along the principal diagonal.

factor summarizes a substantial portion of the variance in the data used. The relatively even distribution of the variance across nine factor dimensions suggests that there is only minimal overlap in the urban patterns 'explained' by the indicators.

At the same time, the four pairs of indicators identified through rank correlation analysis as highly related also stand out in the principal components analysis.

TABLE 2

PRINCIPAL COMPONENTS ANALYSIS:
Percent total variance explained by each factor within the rotated factor matrix

| FACTOR | EIGENVALUE | PERCENT TOTAL VARIANCE |
|---|---|---|
| 1 | 4.34 | 12.74 |
| 2 | 3.84 | 11.31 |
| 3 | 4.49 | 13.19 |
| 4 | 3.47 | 10.21 |
| 5 | 2.28 | 6.71 |
| 6 | 2.14 | 6.28 |
| 7 | 2.06 | 6.05 |
| 8 | 2.27 | 6.66 |
| 9 | 1.64 | 4.83 |

As suggested in table 3, the three urban indicators which describe attributes of housing type and tenure all feature extremely high factor loadings on the first and largest dimension. Similarly, the two indicators for 'average income' load highly on the fourth factor.

TABLE 3

REDUNDANCY AMONG THE URBAN INDICATORS:
Extracts from the Rotated Factor Matrix

| FACTOR ONE: INDICATOR | | FACTOR LOADING |
|---|---|---|
| 26. | Proportion Apartment Units | .892 |
| 28. | Children in Apartments | .845 |
| | City Size (as presented in Population Chart.) | .692 |
| 29. | Public Transit Ridership | .635 |
| 2. | Criminal Code Offences | −.564 |
| 24. | Occupancy Status: Percent Dwellings Owner Occupied | −.880 |
| Percent Total Variance | | 12.73 |
| **FACTOR FOUR: INDICATOR** | | **FACTOR LOADING** |
| 18. | Average Income (adjusted for housing) | .869 |
| 17. | Average Income (non-adjusted) | .807 |
| 5. | Illegitimate Births | −.537 |
| 15. | Number of Hospital Beds | −.571 |
| 4. | Number of Missing Persons | −.744 |
| Percent Total Variance | | 10.21 |

NOTES:
- Only indicators with Factor Loadings $\leq -0.50$ or $\geq 0.50$ are listed for each factor.
- Indicators exhibiting the highest degree of interrelationship one with another are underlined.

TABLE 4:

STATISTICALLY SIGNIFICANT RELATIONSHIPS

| URBAN INDICATOR | NO. SIGNIFICANT RELATIONSHIPS | MODERATE LINKAGE | RELATIVE INDEPENDENCE |
|---|---|---|---|
| 1. Number of Juveniles Charged | 2 | | — |
| 2. Criminal Code Offenses | 7 | * | |
| 3. Percent of Offenses Cleared | 1 | | — |
| 4. Number of Missing Persons | 4 | | |
| 5. Illegitimate Births | 7 | * | |
| 6. Educational Achievement | 11 | * | |
| 7. Public Cultural Opportunities | 1 | | — |
| 8. Public Library Usage | 6 | * | |
| 9. Social Opportunities | 1 | | — |
| 10. Percent Living in Province of Birth | 6 | * | |
| 11. Ethnic Prominence | 8 | * | |
| 12. Number of Major Ethnic Groups | 8 | * | |
| 13. Percent Canadian-Born | 6 | * | |
| 14. Population Turnover | 7 | * | |
| 15. Number of Hospital Beds | 4 | | |
| 16. Voter Turnout | 4 | | |
| 17. Average Income (Non-Adjusted) | 2 | | — |
| 18. Average Income (Adjusted for Housing) | 3 | | |
| 19. Occupational Status | 4 | | |
| 20. Female Labour Force Participation | 8 | * | |
| 21. Unemployment Rates | 1 | | — |
| 22. Annual Strike Days Lost | 3 | | |
| 23. Costs, New Single-Detached Dwellings | 3 | | |
| 24. Owner-Occupied Dwellings | 5 | | |
| 25. New Housing per Added Household | 2 | | — |
| 26. Proportion Apartment Units | 4 | | |
| 27. Apartment Vacancy Rates | 3 | | |
| 28. Children in Apartments | 7 | * | |
| 29. Public Transit Ridership | 3 | | |
| 30. Air Quality: Particulates | 3 | | |
| 31. Air Quality $SO_2$ | 6 | * | |
| 32. Hazard Index | 1 | | — |

NOTES: Statistically significant relationships were determined at the .01 level using Spearman rank correlations.
* 6 significant relationships or more
—2 significant relationships or less

The close correspondence in the findings obtained through the use of the two different approaches provides grounds for contending that one of the 'housing type and tenure' as well as one of the 'average income' indicators is redundant and could therefore be eliminated from the data set without undue loss of information.

## AN OVERALL SUMMARY VARIABLE?

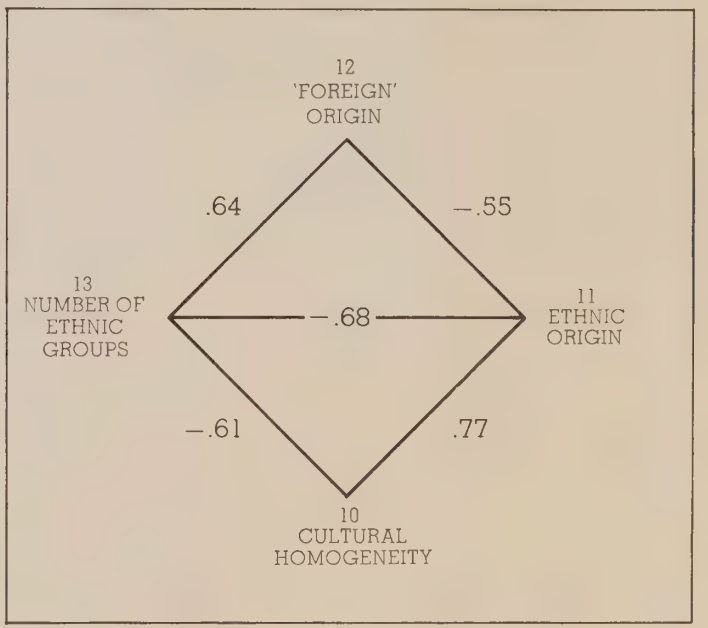
The search for a universal measure that summarizes the quality of life in urban areas is not likely to be successful. The diversity and complexity of urban institutions, practices and lifestyles is such that the derivation of one overall indicator of how one Canadian city is performing vis-à-vis other Canadian urban centres is probably impossible. Nevertheless, we estimated the extent to which each indicator summarized the patterns of variation depicted by all other indicators. A rough measure of the level of summarization achieved by each indicator was obtained by tabulating the number of statistically significant relationships (at the .01 level for Spearman rank correlations) that each indicator possessed with others in the data set.

As table 4 suggests, while a sizeable number of indicators are related to other variables, many others exhibit relative independence. However, none are interrelated with all other indicators to the degree that they might be interpreted as representing an overall summary measure. For example, the 'Educational Achievement' indicator features the highest number of statistically significant correlations with other indicators (11), but many of the relationships identified are relatively low (approximately 0.5), indirect (occurring through intervening variables), implausible, or uninterpretable.

While no summary indicators were found, we did discover clusters of indicators (see table 5). The indicators comprising these clusters are not considered redundant since each describes a different feature of ethnic composition and the migration process characteristic of the particular urban area. For example, the indicators 'Ethnic

TABLE 5

A CLUSTER OF HIGHLY INTERRELATED INDICATORS MEASURING DIFFERENT ASPECTS OF MIGRATION AND ETHNICITY




NOTES:

The cluster was derived from an analysis of the Spearman rank correlations.

All correlations shown are statistically significant at the .01 level.

TABLE 6

THE RELATIONSHIP OF THE URBAN INDICATORS TO THE POPULATION SIZE AND GROWTH RATES OF URBAN AREAS

| URBAN INDICATOR | CITY SIZE | | GROWTH RATE | |
|---|---|---|---|---|
| | $R_s$ | SIGNIFICANCE LEVEL | | |
| 1. Number of Juveniles Charged | −.14 | .274 | −.05 | .418 |
| 2. Criminal Code Offenses | .01 | .480 | .17 | .225 |
| 3. Percent Offenses Cleared | .03 | .447 | .28 | .150 |
| 4. Number of Missing Persons | −.21 | .175 | −.13 | .285 |
| 5. Illegitimate Births | −.24 | .141 | −.16 | .242 |
| 6. Educational Achievement | −.19 | .196 | −.37 | .046 |
| 7. Public Cultural Opportunities | .26 | .123 | .05 | .411 |
| 8. Public Library Usage | .18 | .216 | .17 | .230 |
| 9. Social Opportunities | .08 | .377 | −.16 | .259 |
| 10. Percent Living in Province of Birth | −.39 | .035 | −.48 | .012 |
| 11. Ethnic Prominence | −.06 | .390 | .28 | .103 |
| 12. Number of Major Ethnic Groups | .61 | .001 | .35 | .058 |
| 13. Percent Canadian-Born | −.42 | .025 | −.35 | .056 |
| 14. Population Turnover | −.17 | .223 | .41 | .031 |
| 15. Number of Hospital Beds | −.48 | .013 | −.30 | .091 |
| 16. Voter Turnout | −.23 | .148 | −.37 | .046 |
| 17. Income (Non-Adjusted) | .51 | .008 | .40 | .031 |
| 18. Income (Adjusted for Housing) | .49 | .010 | .27 | .112 |
| 19. Occupational Status | .43 | .022 | .38 | .042 |
| 20. Female Labour Force Participation | .25 | .126 | .43 | .022 |
| 21. Unemployment Rates | −.15 | .249 | −.36 | .051 |
| 22. Annual Strike Days Lost | .34 | .059 | .08 | .364 |
| 23. Costs, New Single-Detached Dwellings | .31 | .081 | .47 | .014 |
| 24. Percent Dwellings Owner-Occupied | −.32 | .072 | −.19 | .197 |
| 25. New Housing Per Added Household | −.01 | .482 | −.46 | .017 |
| 26. Proportion Apartment Units | .33 | .068 | −.04 | .422 |
| 27. Apartment Vacancy Rates | .21 | .178 | −.01 | .486 |
| 28. Children in Apartments | .33 | .068 | .00 | .494 |
| 29. Public Transit Ridership | .63 | .001 | .22 | .174 |
| 30. Air Quality: Particulates | .57 | .004 | .24 | .156 |
| 31. Air Quality: $SO_2$ | −.06 | .415 | −.28 | .134 |
| 32. Hazard Index | .18 | .207 | .27 | .112 |

NOTE:

Only the indicators underlined have statistically significant relationships with city size or growth rate at the .01 level.

Prominence' and 'Number of Major Ethnic Groups' describe different aspects of a city's ethnic structure, namely the prevalence of a specific 'non-offical language' group and cosmopolitanism—the diversity of strong minority cultural groupings in an urban area. Far from being redundant, the cluster of moderately-related indicators provides a greater breadth of information on a specific urban structure and process. A single measure which could adequately describe the process did not emerge.

If our urban indicators are regarded as reasonably adequate measures of the economic, social and environmental aspects of Canada's urban areas, then the association between perceived urban problems (i.e., apartment housing, congestion, crime and pollution) and the population size or the growth rate of Canadian cities is not as high as is commonly believed. Only five of the indicators have a statistically significant association with the measure of city size and only two with growth rates (see table 6). This evidence might lead us to conclude that social, economic and environmental issues are peculiar to individual cities and are not associated with population size or rates of growth, as has been advanced by some observers of the urban scene.

## CONCLUSION

Information has both uses and abuses and unfortunately, this is not always appreciated. While we must base decisions on the best available information, we must also take into account possible errors in information and interpretation. For instance, the interpretation of a high correlation coefficient for a pair of indicators, as is shown in table 1, is fraught with difficulties. Cause and effect is not necessarily demonstrated by strong correlations among variables. The presence of intervening variables in the causal linkage and differences in the reliability of the data collected may serve to create a spurious relationship between particular indicators. Those competent in the application of social statistics are likely already aware of these problems. Others unfamiliar with some of the statistical concepts may wish to refer to the references provided below.[2]

We hope that this brief review of the difficulties encountered and the assumptions made will reduce the risk of error and misinterpretation.

[2] Dogan, M., Rokan, S. (eds.), QUANTITATIVE ECOLOGICAL ANALYSIS IN THE SOCIAL SCIENCES. Cambridge, Mass.: M.I.T. Press, 1969.

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